

OAO/LST SHUTTLE ECONOMICS STUDY

Prepared for

National Aeronautics and Space Administration Goddard Space Flight Center

Contract NAS5-17149

October, 1970

by

GRUMMAN AEROSPACE CORPORATION FACILITY FORM 602 ON NUMBER) (NASA CR OR TMX OR AD NUMBER) (CATEGORY) INFORMATION SERVICE
Springfield, Va. 22151

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Volume II

Appendix to

OAO/LST SHUTTLE ECONOMICS STUDY

Prepared by

GRUMMAN AEROSPACE CORPORATION

for

THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER

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OAO/LST SHUTTLE ECONOMICS STUDY

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IOM-03	Preliminary Proposed Equipment List for LST
IOM-04	Baseline LST Structure Description
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IOM-08	Manufacturing Task Description
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IOM-252E-22	OAO/LST Shuttle Economics Study Task Group 1 1.2 Obtain Shuttle Guidelines, Constraints, Interfaces, Capabilities
IOM-252E-23	Updated Baseline LST Experiment Definition
No. 24	Outline of Final Report
No. 25	Input Output Required For Central Pricing
IOM-252E-26	Status of Systems Engineering as pf 29 July

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Appendix Section 2

Proposal for OAO/LST Shuttle Economic Study

I

PROPOSAL FOR AN

OAO/IST SHUTTLE ECONOMIC STUDY

Submitted

to the

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION Goddard Space Flight Center Greenbelt, Maryland 20771

In Response to

RFP NO. 16067/575

By

GRUMMAN AEROSPACE CORPORATION Bethpage, New York .

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INTRODUCTION

The Grumman Aerospace Corporation is pleased to respond to the Goddard Space Flight Center Request for Proposal, N16067/575 dated 30 June 1970 for an OAO/LST Shuttle Economic Study.

The objectives of this study are two fold. The first objective is to determine the effect of utilizing the Space Shuttle upon the cost of the OAO/ IST point design spacecraft. The second objective is to determine the effects of utilization of the Space Shuttle upon the mission objectives and operational system of the OAO/IST spacecraft.

Our proposal to undertake this study is based on our unique experience in being able to provide the major program elements involved in this effort in a timely fashion to result in a meaningful output.

This study will involve as one major program element the generation of a complete cost model of an OAO/IST based on the GSFC point design spacecraft and launched in what has been considered until now the convential manner employing an expendable booster, the Titan III-C. Early in the concept development phase of the GSFC Program for the Large Space Telescope Grumman contributed to the structural and thermal configuration of this point design. This baseline cost model will undergo several itterations based on possible changes resulting from the introduction of the concept of an Earth Orbital Shuttle (EOS) available for initial launch, deployment, resupply, and retrieval. The effects of this ECC availability on the design and operation of the OAO/IS: spacecrain and one resultant sensitivity to program costs will be presented.

Grumman also has considerable experience in another major study program element - the Earth Orbital Shuttle. We recently competed successfully for a study of several alternate designs after more than 2 years of dedicated effort on the part of several hundred people at Grumman who were involved in the evaluation of Earth Orbital Shuttle Concepts. We propose to draw heavily on this experience for this OAO/IST Economic Study.

Another major program element, which has received little attention in the past, is the Teleoperator device which forms the major interface between the shuttle and spacecraft. Grumman is in a unique position to make a major contribution in this area since it has been involved in the design and evaluation of remote manipulator type devices. These type of devices are employed in the Grumman built deep submersible vehicle, the Ben Franklin. The design experience and actual operational data available from the GAC Ocean Systems Program will be a major source of information for our study team members to draw upon in considering Teleoperator requirements.

An especially significant program element of this study will be credible cost data. To this end Grumman will rely heavily on the cost data available from the present OAO Program which provides a continuous ten year history of cost.

To augment our OAO Program cost history we have also had wide experience in the design, development, and production of large and complex structures, many involving the use of the latest exotic materials technology. This familiarity with requirements and costs will be applied to the cost models in the OAO/IST Economic Study.

An additional interface requirement is the evaluation of the influence of man rated systems on the design of the LST and a comparison of costs associated with man rating on the program. GAC will rely on our LM experience for this area of the study.

In summary, GAC has been familiar with and in many cases a direct participant in the major factors contributing to this OAO/IST Economic Study. Unique experience in these critical areas assures a straightforward approach to the evaluation of the baseline cost model and satisfactory development of interface requirements and definition of the resulting costs for the timely execution of this study.

Part 1 of this proposal is the study guidelines and constraints. Part 2 is the Shuttle Interface considerations with the statement of work and the task Flow Diagram in Parts 3 and 4. Part 5 is the Proposed Schedule. Part 6 contains the cost and pricing summary and financial information.



OAO/LST SHUTTLE ECONOMIC STUDY

PART 1

STUDY GUIDELINES AND CONSTRAINTS

- 1. GSFC/LST point design to be used as baseline definition of observatory (Space Vehicle) hardware elements. This is defined in the following documentation:
 - 1. STAR Presentation
 - 2. Structural Designs for a 120-inch Diameter Advanced Orbiting Telescope X-284-70-147 April 1970
 - 3. Additional material to be supplied
- 2. Shuttle launch vehicle capabilities model to be supplied by GAC Shuttle Group (W. Carl is Shuttle interfaces representative on study team) typical shuttle launch and servicing costs to be supplied by GAC Ops Anal.
 - Note: The 25,000# LST plus handling, servicing and interface equipment will be assumed to be capable of being inserted into a 400 plus, watereal wate, 35% inclination (more as required.
- 3. GSFC/LST mission model as described in the STAR presentation referenced above will be used.
 - Note: The intent of this mission model is to provide up to 90 to 100% observing time availability to orbital astronomy.

 The actual mission model required to accomplish this goal is to be determined by the GAC Study.
- 4. The Titan III D (or equivalent Titan Model designation) Expendable Launch Vehicle with a stretched version of the Viking Centaur Shroud (Fairing) will be used as the model for the baseline costing. The Launch environments and payload constraints of this vehicle will be supplied by CAC/CSFC.
- 5. The LST-peculiar service module for automated resupply of the observatory will be as defined by GAC documentation to be supplied.
 - Note: 1) The intent of this mechanism is to minimize the costs of Man Rating Influences on the payload (LST) costs.

 Maintainability is to be limited to that which can be accomplished with the teleoperation system.

(See documents 4C and 5 for teleoperator references)

5. Continued

- Note 2) EVA maintenance represents a possible alternative to the above service module which, if shown to be feasible, may result in lower IST program costs. Reference 2A, Page 2 states that this should be another study independent of the shuttle. We should consider the possibility of proposing such a study to be done as a follow-on to the present study. Present studies in the Reliab./Maint. section could provide background and justification for such a proposal.
- 6. Observatory checkout, alignment and calibration will be conducted through the GSFC Ground Station and Observatory Spacecraft telemetry link. No special equipment for this purpose is presently envisioned for the shuttle.

Note: The shuttle launch readiness cycle and payload injection operations may require some kind of payload readiness check-out. This requirement will be supplied by shuttle interface group.

- 7. The Shuttle launch vehicle environment imposed on the LST, due to reentry and landing from an abouted mission should be considered next of
 the structural design requirements for the LST and its subsystems. It
 is intended that additional costs due to this requirement be identified
 if significant.
- 8. The Shuttle launch vehicle will be considered to be available for the LST program starting CY 1977 and as required by the STAR mission Workload thereafter.
- 9. Potential hazards created by the LST spacecraft when on-board the Shuttle should be reduced to a level to be determined by the shuttle interfaces group.

Note: A reference to "Category III b" of Safety Program Directive No. 1, Rev. A (SPD-1A)

- Systems Safety Requirements for Manned Space Flight, has been given as one guideline.
- 10. Shuttle capabilities for rendezvous, docking, and subsequent attitude stabilization and electrical power support of the docked configuration will be determined by the Shuttle Interfaces group.

- Availability of a Data Relay Satellite System for continuous real-time 11. communications between the observatory and the ground is not known this time. Advantages of DRSS will be listed but not costed.
- Spacecraft systems failures should be categorized as: those capable of 12. repair and replacement in orbit through automated procedures, and those requiring retrieval and ground repair. EVA activity will be considered as an alternate to retrieval only.
- 13. The Level of Modularity for Orbital resupply is assumed to be at the Subsystem Assembly Level as described in the STAR presentation.
- 14. Experiment Package replacement will be performed for two reasons:
 - 1) Experiment mission change typically a one year mission duration is estimated for the particular experiment.
 - Experiment equipment failure will require package replacement at the next scheduled shuttle visit. Since four independent experiments will be in the observatory payload, the loss of one would not cause loss of scientific mission.
- The Observatory Spacecraft will be defined for the purposes of this study 15. as being comprised of the following subsystems which include a number of separate modules.
 - Stabilization and Control
 - Communications
 - Data Handling
 - Electrical Power
 - Structure
 - 5) 6) Thermal
 - Experiment
 - Primary Optics
- 16. The shuttle launch mode is defined as including the phases of:
 - Configure shuttle for dedicated IST mission
 - Stacking in the shuttle payload bay
 - Shuttle ground checkout and launch readiness cycle
 - Shuttle launch
 - Boost to orbit
 - Orbital transfer (if required)
 - Payload deployment including checkout
 - Payload release

- 17. The Shuttle instrument update mode is defined as including the phases of:
 - Configure Shuttle for dedicated LST mission
 - 1) Loading replacement experiment packages in the shuttle payload bay
 - 2) As in 16
 - As in 16
 - As in 16
 - 5) 6) As in 16
 - Rendezvous with LST
 - 7) Docking to LST
 - 8) Service module and experiment package deployment
 - 9) Experiment package replacement
 - 10) Service module and old experiment package return and STOW
 - 11) Shuttle return to earth
- The shuttle refurbish (orbital) mode is defined identically with the 18. instrument update mode with the substitution of "Subsystem Package" for "experiment package".

Note: Both instrument update and subsystem replacement can be performed simultaneously.

- The shuttle retrieval mode is defined as including the following phases: 19.
 - Shuttle Rendezvous with IST
 - LST Capture
 - LST return to STOW Configuration
 - LST STOW in shuttle
 - Shuttle return to Earth
 - LST unload from shuttle
- 20. IST has backup S&C System capable of putting IST in safehold mode for shuttle retrieval comprised of sun sensor, gyros and jets.

OAO/LST SHUTTLE ECONOMIC STUDY

PART 2

SHUTTLE INTERFACE CONSIDERATIONS

- 1. Shuttle guidelines and constraints are: Section A, Baseline System Requirements; Section B, Mission Requirements; and Section C, Desired System Characteristics.
- 2. Shuttle capabilities with regard to altitude and angle of inclination have been calculated and are compatible with the IST orbital requirements.

3. Interfaces:

- a) Structural
 - 1. It can be assumed that lateral and longitudinal support can be provided in 2 planes to avoid weight penalty of cantilevered support.
 - 2. Deployment Retrieval It can be assumed that EOS will provide deployment. Deployment should be translational until IST in outside cargo bay. Deployment mechanism will include a docking mechanism for capturing IST for servicing, module replacement, or return to earth.
 - 3. Shrouding LST can be transported to orbit within a pressurized module with thermal control or simply installed in the unpressurized bay.

b) Electrical

1. Electrical Power

Electrical Interface

Power available from Shuttle for use by payload:

Type:

D.C. 120 Volts (May become 28 volts)

A.C. 400 Cycles 120 Volts

Quantity:

500 watts available. More could be made available, if necessary.

Docking

Accelerations assumed:

CONDITION	${\tt N_{_{\mathbf{X}}}}({\tt g})$	N _y (g)	$N_{\mathbf{z}}(\mathbf{g})$
Max. Accel	+3.0 -1.30	±1. 0	+2.5 -2.7
Entry	-0.13	±0.1	-2.2
Landing	-1.30	±0.1	-2.7
Maneuver Rebound &	-0.7	±1.0	±2.5
Lift Off	+1.45	±0.5	±0. 8

PARAMETER

BASELINE DESIGN

±15 in ±40° ±40°

0-0.5 ft/sec

Miss Distance Centerline
Miss Angle Centerline
Rotation Angle
Contact Velocity

SECTION A

BASELINE SYSTEM REQUIREMENTS

The following characteristics shall be considered as baseline system requirements. Variations from these baseline requirements should be identified by the contractor in the event improvements in mission capability and/or reductions in cost could be achieved.

	Systems Requirements	Vehicle (B-Booster) (0-Orbiter)
1.	Fully Reusable Two (2) Stage Vehicle	В, О
2.	Vertical Takeoff; Horizontal Landing	В, О
3.	No propellant cross feed .	в, о
4.	Aerodynamic Crossrange: Configuration (s) for low crossrange (approximately 200 n.mi.) and high crossrange (approximately 1500 n.mi.)	0
5.	Gross liftoff weight - 3.5 million pounds	В, О
6.	The cargo bay shall be sized to have a clear volume of 15' diameter X 60' length.	0

	Systems Requirements	Vehicle (B-Booster) (0-Orbiter)
7•	A maximum payload capability shall be provided to the Space Station orbit and return. The vehicle must also be capable of flying up or down with lighter payloads.	0
8.	400,000 pound sea level thrust bell-type engines will be baselined in both the orbiter and booster stages as further defined in CEI Specifications, DCN 1-0-21-00001.	В, О
9.	Sequential Ignition	в, о
10.	Intact about capability will be provided. This implies the capability of the booster and orbiter to separate and continue flight to a safe landing; the orbiter to land with a full payload.	в, о
11.	A Booster/Orbiter life of 100 missions will be provided with a cost effective level of refurbishment and maintenance.	в, о
12.	The weight of passengers and removable provisions for passengers is charged to the payload.	0
13.	All vehicle stages shall be capable of ferry flights between airports; provisions for strap-on engines and/or auxiliary tankage may be considered.	в, о
14.	The Booster and Orbiter shall be baselined to have go-around capability.	В, О
15.	The Booster shall be capable of returning to the launch site.	В
16.	The Booster and Orbiter shall each have a two (2) man flight crew.	в, о
17.	Propellant shall provide 1500 fps in excess of the amount required to obtain the referenced injection orbit. The tanks shall be sized to provide for a 2000 fps delta V capability.	_
18.	The Orbiter crew and passenger environment shall a shirtsleeve.	pe O
19.	Systems sensitivity to loading of fluid consumable shall be minimized.	es B, O

SECTION B

MISSION REQUIREMENTS

The following mission requirements are presented to provide initial direction for the Phase B Study. Continuous refinement of these requirements may be provided to the contractor by the NASA throughout the duration of the contract. Table B-1 contains a general description of the missions and mission requirements that have been identified as being of major interest in future space program planning.

The following nominal conditions have been selected, from the mission matrix discussed previously, as the shuttle baseline requirements:

- 1. Mission duration: At least 7 days of self-sustaining lifetime shall be provided for the mission duration. For missions in excess of 7 days the weight of the expendables shall be charged against the payload.
- 2. Design reference mission: The reference mission to be used in designing the space shuttle is a logistics resupply of a space station or space base.
- 3. Reference injection orbit. The reference injection orbit shall be 50×100 nautical miles.
- 4. Reference injection orbit V: 1500 fps of usable V capability in excess of the amount required to attain the reference injection orbit shall be provided.
- 5. Design reference orbit: The reference orbit to be used in designing the space shuttle shall be a 270-nautical mile circular orbit, with a 55° inclination. For purposes of performance calculation the vehicle shall be considered to be launched from a lattitude of 28.5 degrees North.

TABLE B-1.

MISSION CHALACTERISTICS

MISSIONS ORBITAL CHARACTERISTICS	SPACE STATION/ BASE LOGISTICS SUPPORT	PLACEMENT AND RETRIEVAL OF SATELLITES SO	IELIVERY OF FROPULSIVE PACES & PAYLOAD	DELIVERY OF PROPELLANTS	SATELLITE SERVICE & MAINTENANCE	SHORT DURATION ORB. MISSION
ALTITUDE (N. MI.)	200 - 300	100 - 800	100 - 200	200 - 300	100 - 800	100 ~ 300
INCLINATION (DEG.)	28.5-90	28.5-SUN SYN.	28.5-55	28.5-55	28.5-sun syn	28.5-90
ON-ORBIT V (1000 FPS)	'l - 2	1 - 5	1 - 1.5	1 - 2	1 - 5	1 - 2
ON-ORBIT STAY						
TIME (DAYS)	7	7	7	7	7 - 15	7 - 30
CREW	2	2	2	2	2	2
PASSENGERS	ROTATE 50 MEN/QTR	2	2	2	4	12
DISCRETIONARY PAYLOAD						
WEIGHT (1000 LBS.)	* 70/QTR	400 MP and now case you days not case		*		40 40 40 ap on 10 10 10 ft for 40
VOLUME (1000 FT. ³)		5 - 10	10	10	5 ~ 10	4 - 6
CRITICAL DIMEN DIA. (FT.)	10 - 15	15	15	15	15	15

^{*} INCLUDE PASSENGERS

SECTION C

DESTRED SYSTEM CHARACTERISTICS

The desired system characteristics listed below are presented to provide initial direction for the Phase B Study. The contractor shall evaluate these desired system characteristics and shall recommend revisions where improvements in cost and effectiveness would result. Continuous refinement of these characteristics will also be provided to the Contractor throughout the duration of this contract. For convenience, the following tabulation of characteristics has been grouped under three headings: Program Characteristics, Vehicle Characteristics, and Operational Characteristics; however, it should be noted that each item applies to the total system.

Program Characteristics

- 1. Costs will be reported using the design reference mission and should not included payload costs. A communication satellite system is assumed to be available and shall not be costed in the program.
- 2. The calendar year 1972 will be used as the materials technological base.
- 3. IOC baseline is the second half of 1977.
- 4. Flexibility shall be maintained to incorporate technology advancement and alternate missions.
- 5. Launch rates will vary from a minimum of 25 to a maximum of 75 per year. Cost estimates shall be developed for two launch rates: 25 and 75/year.

Vehicle	Characteristics	Vehicle (B-Booster) (O-Orbiter)
1.	The vehicle shall have a two-man flight crew and shall be flyable underemergency conditions by a single crewman.	B, 0
2.	Provisions shall be made for deployment and boarding of a cylindrical payload of the size specified in Appendix A of this document.	0

Vehicle (Characteristics (Continued)	Vehicle	(B-Booster) (0-Orbiter)
3.	The crew environment shall be shirt-sleeve.	В,	0
4.	The space shuttle shall have an internal sealable tunnel with a standard interface between the crew compartment and unpressurized payload bay.		0
5.	The space shuttle crew/passenger compartment atmosphere and total pressure shall be compatible with the space station and space base.	•	0
6.	Systems shall be designed for a minimum of maintenance with ease of removal and replacement; maximum use of aircraft design practice will be used.	В,	0
7.	In systems where redundancy is needed, the space shuttle systems shall be developed to provide redundant full mission capability and shall avoid minimum-requirement, minimum performance backup system concepts.	B ,	0
8.	The space shuttle system shall provide for satisfication termination in the even major malfunctions occur during prelaunch preparations and subsequent to lift-off. The desired safemission-termination capabilities should allow for crew and passenger egress prior to lift-off and for intact separation of orbiter from booster following lift-off.	•	0
9•	Multiple redundance system techniques that minimize or eliminate system transients caused by system component failures shall be adopted.	В,	0
10.	All subsystems shall be designed to fail operational after the failure of the most critical component and to fail safe for crew survival after the second failure. Electronic systems shall be designed to fail operational after failure of the two most critical components and to fail safe for crew survival after the third failure.	В,	0

<u>Vehicle Characteristics</u> (Continued) V			(B-Booster) (0-Orbiter)
11.	Boost stages should be designed for manned operations, but capable of operating in an unmanned mode.	В	
12.	Vehicle preflight and inflight checkout systems should be on-board, consistent with short turn-around and low cost operations.	В,	0
13.	The vehicle shall be designed for maximum on-board control, using on-board and ground capabilities as appropriate to maximize operational flexibility and minimize ground mission operations consistent with low cost.	В,	0
14.	Guidance and navigation functions shall be performed on-board, using ground and other navigation aids when appropriate. The guidance and navigation system shall be unrestricted in attitude.	В,	o
15.	A three-axis translation system and a three-axis attitude control system is required. These systems shall be designed to minimize cr coupling which may result from normal operation and from potential failure modes.		•
16.	The Booster and Orbiter shall be capable of Pilot Controlled Landing under FAA Category II Conditions. Autopilot Systems similar to Systems used on commercial aircraft shall be included.	В,	0
17.	The vehicle shall incorporate on-board provisions to quickly and easily place the space shuttle in a safe condition following landing.	В,	0
18.	Survivability against hazards from radiation as specified in Joint DOD/NASA Survivability Characteristics document (s) dated 16 June 196	9.	0
19.	Hydrogen will be baselined as fuel for the air breathing engines.	. В,	0

Operation	nal Characteristics	Vehicle	e (B-Booster) (O-Orbiter)
1.	Space Shuttle launch sites may be located at KSC, Western Test Range, or an in-land site.	В,	0
2.	All-azimuth launch capability	в,	0
3•	The vehicle trajectory load factors should be a 3g capability for passenger-carrying missions.	В	0
14.	The launch pad, the primary landing site, and the servicing facility shall be in the same general location.	В,	0
5•	The space shuttle shall have minimal assembly and checkout requirements at the launch pad,	В,	0
6.	Use of specialized facilities (ie, Clean Room, altitude chambers, etc.) shall be minimized).	В,	0
7•	Cargo elements containing hazardous material shall have self-contained protective devices or provisions against all nazards.		0
8.	A variety of self-sustaining payload types shall be included in the payload integration. Pre- launch payload integration procedures similar to current air-cargo carrier operations are desired In general, payloads should be loaded prior to moving to the launch pad.	•	0
9•	Limited transfer of cargo shall be possible throthe personnel transfer hatch.	ugh	0
10.	The vehicle shall be docked to the space station or space base, and docking to accommodate person and cargo transfer should nominally be accomplisin a single operation.	nel	0
11.	Personnel and cargo transfer shall nominally be intravehicular activity.		0
12.	For logistics missions, personnel and cargo transfer will be by intravehicular activity. EVA capability should be provided at the expense of the allocated payload weight. The design of the vehicle should not preclude EVA capability.	•	0

Operation 1	nal Characteristics (Continued)	Vehicle	(B-Booster) (0-Orbiter)
13.	The space shuttle shall be designed to lift- off within a 60-second launch window for all launch azimuths.	В,	0
14.	For the design reference mission, the space shuttle shall be capable of launch from a standby status within two hours and nominally would be launched at the next acceptable inplane opportunity. The vehicle should be capable of staying in a launch status until the second in-plane launch opportunity. The system must be capable of accommodating the time between insertion and rendezvous for a worst case phasing situation. The orbit maneuver sequence should not be constrained by systems limitations.	В,	0
15.	By using ground facilities and other aids when appropriate, the space shuttle shall be cpable of accomplishing rendezvous with a passive target.	,	0
16.	Systems sensitivity to weather conditions during assembly, checkout, and launch shall be minimized.	В,	0
17.	The opportunity to return to a pre-selected site shall be available at least once every 24 hours or at more frequent intervals for the high cross-range configuration. By using alternate sites, more frequent emergency returns will be possible.	5	0
18.	Hypersonic lift-drag ratios will be referenced to conditions at a Mach number of 20 and at an altitude of 200,000 feet.	В,	0
19.	The space shuttle elements shall have the capability to land horizontally on runways no longer than 10,000 feet.	В,	0
20.	landing characteristics and handling qualities shall not require skills more demanding than those required foroperational land-based aircraft.	В,	0

<u>Operatio</u>	nal Characteristics (Continued)	Vehicle (B-Booster) (0-Orbiter)
21.	Visibility from the cockpit during landing shall be comparable to high-performance aircraft standards.	в, о
22.	Total space shuttle turn-around time from landing to launch readiness should be less than two weeks. The removal and replacement time shall be minimized with on-board checkout and module accessibility.	В, О
23.	All-electronic displays and control should be used, wherever practicable, to replace toggle switches and electromechanical gages and motors.	, B, O
24.	The space shuttle shall be capable of operating within the cargo range from zero to maximum capability.	В, О
25.	Service lines at the launch pad should be minimal, preferably only for the main propulsion systems propellants.	В, О
26.	Maximum use of existing standards for the selection, design, packaging and integration of hardware should be employed, consistent with program operational requirements.	В, О
27.	Any peculiar GSE required to support a remote site landing should be packaged in a manner to be easily flown into the site.	В, О

1.4.3 Expendable Launch Vehicle

Titan III Vehicle Interface Shroud

1.4.4 Ground Operations

Ground Control Station/Crew Manned Operations Control/Crew Facilities/Test, Handling Crew

- 1.5 Breakdown Major Cost Elements to Subsystem Hardware Level into:
 - 1.5.1 Direct cost hardware and develop recurring, non-recurring, refurbishment.
 - 1.5.2 Contribution to GSE, spares, major test hardware, final assembly test and checkout.
 - 1.5.3 Pro-rated costs of system engineering support, program management, G&A.
- 1.6 Establish Detailed Definition of Resupply or Service Modes to Include Tourney Instrument Indate, Refurbish (Ombital), and Retrieval.
- 1.7 Define Functional, Hardware, and Operation Requirements Peculiar to OAO/IST Mission for:
 - 1.7.1 Observatory
 - 1.7.2 Shuttle
 - 1.7.3 Ground Station
- 1.8 Define Subsystem Hardware Level Requirements for Costing and Establish Preliminary Criteria with and without Mainteance and:
 - 1.8.1 Identify development items
 Identify state-of-art items
 Identify on-shelf items
 Identify refurbish design requirements
 Establish spares philosophy and identify cost impact
 - 1.8.2 Establish definition of cost validity (average, plus or minus tolerances).
 - 1.8.3 Rank cost factors in order of importance.

1.9 Establish Reliability-Maintainability Model Replaceable Modules using OAO Flight System Experience. Maintainability is Limited to that which can be accomplished with the Teleoperator System.

TASK GROUP 2

DETERMINE MAJOR COST DRIVERS, UTILIZING DEFINITIONS OF TASK 1 AND COST DATE FROM OAO, IM, AND SHUTTLE PROGRAM

- 2.1 Establish Preliminary Cost Model with and without Shuttle. Quantify and Rank Major Cost Elements for Each Model; Select Principle Cost Drivers.
- 2.2 Study and Quantify Cost Benefit Effects of Shuttle Serviceability on Hardware Cost Drivers in Each of Following Areas:

2.2.1 Design

- o Lower qualification requirements
- o Lower reliability requirements
- o Lower weight optimization requirements
- o Lower material performance requirements

2.2.2 Test and Checkout (Ground and In-Orbit)

- o Lower acceptance-test requirements
- o Lower test elements
- o Lower number of test articles
- o Determine alignment and calibration trade-offs for telescope
- 2.3 Study and quantify cost benefit effects of shuttle serviceability on Program Cost Drivers in each of following areas:

2.3.1 Schedules

- o Long lead items
- o Pacing items
- o Repair and turn-around

2.3.2 Facilities

- o Test
- o GSE
- o Shuttle Support Equipment
- o Spares Handling

- 2.3.3 Services (Manpower)
 - o Engineering
 - o Manufacture
 - o Field Operations
 - o Test

2.3.4 Spares

Shelf Life, Complement and Readiness

- 2.4 Expand Reliability Maintenance Study
 - Identify and rank wear-out items for each subsystem
 - Determine expendables schedule
 - Determine required reliability functional path (assume maintenance rate)
 - Determine Reliability and Maintenance Cost optimize approach for hardware in critical (costly) areas, e.g. level of redundancy vs. replacement.
- 2.5 Expand Experiment Package Definition Study for two Cost Categories.
 The first is the on-axis mission success package. The second is the principle investigators radial packages.
 - Estimate replacement cycles rates based on scientific requirements
 - Categorize generically physical characteristics for typical experiment types.
 - Estimate typical experiment cost; original development and build.
 - Estimate typical refurbishment and upgrade package cost
 - Estimate special handling, hardware, test, alignment, calibration for orbital servicing

TASK GROUP 3

IDENTIFY AND EVALUATE COMPARITIVE COSTS FOR SELECTED PROGRAM OPTIONS

- 3.1 Assemble selected program options for cases with and without shuttle resupply
 - o Evaluate feasibility of alternatives
 - o Evaluate sensitivities of major cost drivers to program alternatives, varying parameters
 - o Analyze effects of basic study assumptions on cost results.
- 3.2 Indicate best Reliability-Maintainability approach for design, manufacture, operation for each selected program Determine logistics/spares rationale, each case.
- 3.3 Estimate manpower, materials, facilities, and related costs required to refurbish and recycle observatory.

- 3.4 Estimate development, build, test, training costs associated with automated servicing module look at EVA/IVA alternative.
- 3.5 Summarize comparative costs for selected program options.

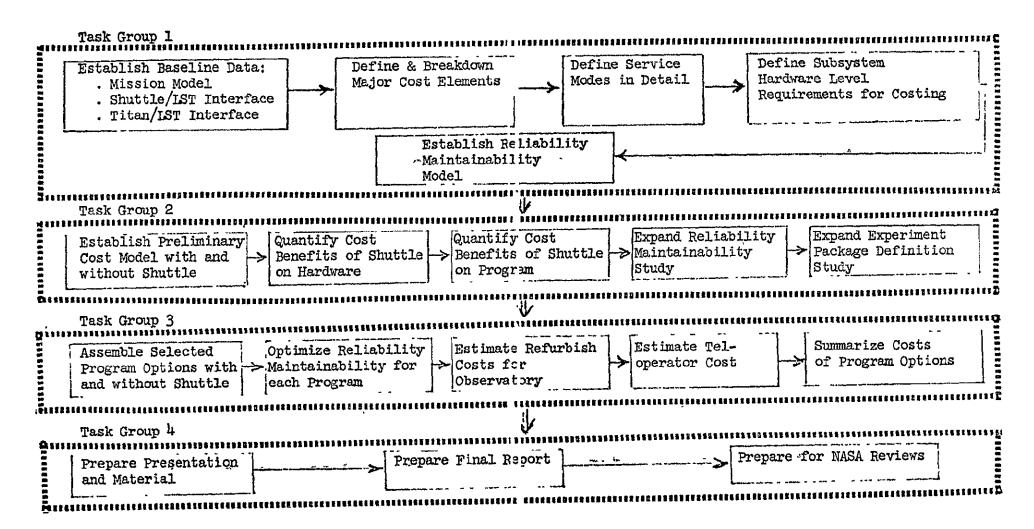
TASK GROUP 4

FINAL REPORT

- 4.1 Presentation of results generate charts, graphs, etc. prepare presentation.
- 4.2 Final Report OAO/IST Shuttle Economics Study
- 4.3 NASA Reviews

OAO/IST SHUTTLE !CO NOMIC STUDY

TASK FLOW DIAGRAM



Appendix Section 3
Reliability/Maintainability Outputs

Appendix Subsection 3A

Apportionment Computer Output Summary

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4 STRUCTURE	9.00	5.00	5.00	10.00	10.00	5.00_	10.00	52.00	
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3 THERMAL	0.910542	0.866258	0.813520	0.756797	0.981841
4 STRUCTURE	0.942977	0.913978	0.878709	0.839808	0.988584
5 FLECTRICAL POWER	0.914664	0.872273	0.821652	0.767029	0.982709
6 DATA HAND. & COMM.	0.874273	0.813960	0.743861	0.670638	0.974068
7 PRIMARY OFTICS	0.953685	0.929925	0.900833	-C- 0.868482	0.990770
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LARGE	SPACE TÉLESCOPE	(LŠT) MISŠION SUC	CĈESS APPORTTONMÊNT	N 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-
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AVAILABILITY GOALS	0.466667	0.311111 .	0.186667	0.884211	0.840000
NO ITEM NAME .		AVAILA	BILITY APPORTION	IENTS	
	~~ 0.96560š	0.947789	0.925813	0.994364	0.992025
I EXPERIMENT				0.987139	0.981828
2 STABIL & CONTROL	0.922963	0.884428			
3 THERMAL ,	0.910542	0.866258	0.813520	0.984982	
4 STRUCTURE	0.942977	0.913978	0.878709	0.990565	0.986658
STELECTRICAL PÖWER	0.914664	0.872273	0.821652	0.985701	0.979801
6 DATA HAND. E COMM.	0.874273	0.813960	0.743861	0.978539	0.969730
7 PRIMARY OPTICS	0.953685		0.900833	0.992372	0.989210
B DOCKING MECH.		0.870765	0.819611	0.985521	0.979548
	0.875261		0.745713	0.978717	0.969980
9 PNEUMATICS	0.075201	U 0 1 3 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7			
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LARGE	SPACE TELESCOPE (LST) MISSION SUC	CESS APPORT LONMENT	and the substance, having time because in material streets. The material substance of the s		
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AVAILABILITY GOALS NO . ITEM NAME	0.800000	0.763636	*************	0.700000 ENTS	0.560000	
1 FXPERIMENT	0.989804	0.987692	o.∙985678	0.983753	0.973723	
2 STABIL & CONTROL	0.976802	0.972034	0.967500	0.963178	0.940834	-
3 THERMAL	0.972935	0.967385	0.962112	0.957090	0.931186	
4 STRUCTURE	0.982957	0.979440	0.976092	0.972897	0.956315	
5 FLECTRICAL POWER	0.974222	0.968932	0.963904	0.959115	0.934391	
6 DATA HAND. E COMM.	0.961424	0.953572	0.946129	0.939056	0.902831	** **
7 PRIMARY OPTICS	0.986211	0.983361	0.980645	0.978051	0.964565	
8 DOCKING MECH.	0.973900	0.968545		0.958608		
PNEUMATICS	0.961742	0.953953	0.946568	0.939552	0.903607	-
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LARGE S	PACE TELESCOPE (LS	T) MISSION SUCCES	S ĀPPORTIÖNMENT	1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1	
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· AVAILABILITY GOALS	0.400000	0.254545	0.896000	0.861538	0.829630
NO. ITEM NAME		AVA ILAR ILI	TY APPORTIONMENT	'S	**********
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1 FXPERIMENT	0.958792	0.939094	0.994969	0.993179	0.991459
? STABIL. & CONTROL	0.908119	0 865955	0.988516	0.984446	0.980546
3 THERMÂL	0.893446	0.845145	0.986588	0.981841	0.977295
ă STRUCTÛRE	0.931845	0.899957	0.991576	0.988584	0.985714
5 ELECTRICAL POWER	0.898310	0:852025	0.987230	0.982709	0.978378
6 DATA HAND. & COMM.	0.850834	0.785667	0.980826	0.974068	0.967608
7 PRIMARY OPTICS	0.944581	0.918386	0.993190	0.990770	0.988446
8 DOCKING MECH.	0.897092	0.850300	0.987069	0.982492	0.978107
PNEUMATICS	0.851989	0.787261	0.980986	0.974283	0.967876
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LARGI	E SPACE TELESCOPE	(LST) MISSION SUCC	ESS APPORTIONMENT		
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AVAILABILITY GOALS	0.800000	0.772414	0.746667 .	0.622222	0.466667
		AVAILABI		• • • • • • • • • • • • • • • • • • • •	1 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
NO. ITEM NAME		******************	***********		
1 FXPERIMENT	0.989804	0.988210	0.986673	0.978446	0.965603
2 STABIL. E CONTROL	0.976802	0.973203	0.969739	0.951319	0,922963
3 THERMAL	0.972935	0.968746	0.964716	0.943328	0.910542
4 STRUCTURE	0.992957	0.980303	0.977746	0.964109	0.942977
5 ELECTRICAL POWER	0.974222	0.970229	0.966387	0.945984	0.914664
6 DATA HAND. & COMY.	0.961424	0.955495	0.949801	0.919758	0.874273
7 PRIMARY OPTICS	0.986211	0.984060	0.981987	0.970910	0.953685
8 DOCKING MECH.	0.973900	0.969858	0.965969	0.945320	0.913632
9 PNEUMATICS	0.961742	0.955861	0.950212	0.920404	0.875261
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LARGE SI	PACE TELESCOPE	(LST) MISSION SUCC	ESS APPORTIONMENT		Conference of the second secon
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AVAILABILITY GOALS	0.800000	0, 777778	0.666667	0.518519	0.358974
NO. ITEM NAME		AVAILABI	· · · · · · · · · · · · · · · · · · ·		
1 FXPERÎMENT	0.989804	0.989524	0.981551	0.970287	0.954039
2 STABIL. & CONTRÓL "	0.976802	0.973912	0.958248	0.933249	0.897841
3 THERMAL	0.972935	0.969570	0.951365	. 0.922416	0.881636
4 STRUCTURE	0.982957	0.980826	0.969247	0.950662	0.924110
5 ELECTRICAL POWER	0.974222	0.971015	0.953654	0.926013	0.887005
6 DATA HAND. E COMM.	0.961424	0.956661	0.931013	0.890664	0.834756
7 PRIMARY OPTICS	0.986211	0.984484	0.975087	0.959957	0.938242
8 DOCKING MECH.	0.973900	0.970654	0.953081	0.925112	0.885660
9 PNEUMATICS	0.961742	0.957018	0.931572	0.891531	0.836024
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. AVAILABILITY GOALS .	0.908108	0.884210	0.861538	0.840000	0.819512
NO. ITEM NAME		AVAILAG	ILITY APPORTIONS	IFNTS	
					0.990900
1 EXPERIMENT	0.995583	0.994364	0.993179	0,992025	
2 STABIL E CONTROL	0.989912	0.987139	0.984446	0.981828	0.979281
3 THERMAL	0.988217	0.984982	0.981841	0.978789	0.975822
4 STRUCTURE	0.992602	0.990565	0.988584	0.986658	0.984783
5 ÉLECTRICAL POWER	0.988782	0.985701	0.982709	0.979801	0.976974
6 DATA HAND. & COMM.	0.983150	0.978539	0.974068	0.969730	0.965518
7 PRIMARY OPTICS	0.994020	0.992372	0.990770	0.989210	0.987691
8 DOCKING MECH.	0.988641	0.985521	0.982492	0.979548	0.976685
7 7 PNEUMATICS	0.983290	0.978717	0.974283	0.969980	0.965802
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LARGE	SPACE TELESCOPE	(LST) MISSION SUCC	CESS APPORTIONMENT		*
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. AVAILABILITY GOALS .	0.800000	0.700000	0.560000	0.40000	0.911628
NO ITEM NAME	,	AVA ILAB I	ILITY APPORTIONME	INTS	t.
1 EXPERIMENT	0.989804	0.983753	0.973723	0.958792	0.995760
2 STARIL. È CONTROL	0.976802	0.963178	0.940834	0.908119	0.990315
"3 THERMAL	0.972935	0.957090	0.931186	0.893446	0.988688
4 STRUCTURE	0.982957	0.972897	0.956315	0.931845	0.992898
5 ELECTRICAL POWER "	0.974222	0.959115	0.934391	0.898310	0.989230
6 DATA HAND & COMM.	0.961424	0.939056	0.902831	0.850834	0.983821
7 PRIMARY OPTICS	0.986211	0.978051	0.964565	0.944581	0.994260
a DOCKING MECH.	0.973900	0.958608	0.933589	0.897092	0.989094
9 PNEUMATICS	0.961742	0.939552	0.903607	0.851989	0.983956
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AVAILABILITY GOALS .	0.890909	0.871111 .	0.852174 .	0.834043	0.816667
NO !TFMNAME .	•••••••••••	AVAILA	BILITY APPORTION	ENTS _	
I FYPFRIMENT	0.994709	0.993683	0.992680	0.991700	0.990742
2 STABIL & CONTROL	0.987923	0.985591	0.983315	0.981093	0.978923
THERMAL THERMAL	0.985897	0.983176	0.980522	0.977933	0.975405
4 STRUCTURE	0.991141	0.989426	0.987752	0.986117	0.984519
5- ELECTRICAL POWER	0.986572	0.983980	0.981452	0.978985	0.976576
6 DATA HAND. 6 COMM.	0,979841	0.975967	0.972193	0.968514	0.964926
7 PRIMARY OPTICS	0.992838	0.991451	0.990096	0.988772	0.987478
** 8 DOCKING MECH.	0.986403	0.983779	0.981220	0.978722	0.976283
9 PNEUMATICS	0.980009	0.976167	0.972423	0.968774	0.965215
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LARC	SE SPACE TELESCOPE	(LST) MISSION SU	CCESS APPORTIONMENT		
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. AVAILABILITY GOALS	0.725926	0.593939	0.435556	0.914286	0.896000
. NO ITEM NAME	· · · · · · · · · · · · · · · · · · ·	· • • • • • • • • • • • • • • • • • • •	BILITY , APPORTION	* * * * * * * * * * * * * * * * * * * *	
T * * * * * * * * * * * * * * * * * * *	• • • • • • • • • • • • • • • • • • • •	••••••		************	
I FXPERIMENT	0.985397	0.976358	0.962549	0.995893	0.994969
2 STABIL. & CONTROL	0.966870	0.946675	0.916290	0.990618	0.988516
3 THERMAL AT	01.961380	0.937948	0.902850	0.989042	0.986588
4 STRUCTURE	0.975626	0.960660	0.937979	0.993120	0.991576
5 ELECTRICAL POWER	0.963206	0.940848	0.907308	0.989567	0.987230
6 DATA HAND. & COMM.	0.945096	0.912245	0.863704	0.984326	0.980826
7 PRIMARY OPTICS	0.980267	0.968103	0.949600	0.994440	0.993190
A DOCK ING MECH.	0.962749	0.940122	0.906192	0.989435	0.987069
9 PNEUMATIĈS	0.945544	0.912950	0.864768	0.984457	0.980986
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LARGE	SPACE TELESCOPE"	(LŠT) MISŠION SUC	CESS APPORTIONMENT		
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AVAILABILITY GOALS	0.878431	0.861538	0.845283	0.829630	0.746667
. NO. ITEM NAME		AVAILAB			*******
			- 0.992310	0.991459	0.986673
1 FXPERIMENT		0.993179			
2 STABIL. & CÓNTROL	0.986459	0.984446		0.980546	
3 THERMAL T	0.984188	0.981841	~0.979544	0.977295	0.964716
4 STRUCTURE	0.990064	0.988584	0.987135	0.985714	0.977746
S ELECTRICAL POWER	0.984944	0.982709	0.980520	0.978378	0.966387
6 DATA HAND. E COMM.	0.977408	0.974068	0.970802	0.967608	0.949801
7 PRIMARY OPTICS	0.991967	0.990770	0.989596	0.988446	0.981987
8 DOCKING MECH.	0.984755	0.982492	0.980276	0.978107	0.965969
9 PNEUMATICS	0.977596	0.974283	0.971044	0.967876	0.950212
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. AVAILABILITY GOALS	0.622272	0.466667	0.920548	0.908108	0.896000	
. NO ITEM NAME.		_ AVAILAS	LITY APPORTIONM	ENTS		
1 EXPERIMENT	0.978446	0.965603	0.996205	0.995583	0.994969	
2 STABIL. & CONTROL	0.951319	0.922963	0.991370	0.989912	0.988516	
3 THERMAL	0.943328	0.910542	0.989872	0.988217	0'+986588	
4 STRUCTURE	0.964109	0.942977	0.993643	0.992602	0.991576	دسم بريد محسد
5 ELFCTRICAL POWER	0.945984	0.914664	0.990358	0.988782	0.987230	
6 DATA HAND. & COMM.	0.919758	0.874273	0.985511	0.983150	0.980826	
7 PRIMARY OPTICS	0.970910	0.953685	0.994862	0.994020	0.993190	» · ·
a DOCKING MECH.	0.945320	0.917632	0.990236	0.988641	0.987069	
9 PNEUMATICS	0.920404	0.875261	0.985632	0.983290	0.980986	-
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AVAILABILITY GOALS .	0.884210	0.872727	0.861538	0.800000	0.700000
NO. ITEM NAME		AVAILAG	ILITY APPORTIONS	ENTS	
1 EXPERIMENT	0.994364	0.993767	0.993179	0.989804	0.983753
2 STABÍL. & CONTROL	0.987139	0.985783	0.984446	0.976802	0.963178
3 THERMAL	0.994982	0.983400	0.981841	0.972935	0.957090
4 STRUCTURE	0.990565	0.989568	0.988584	0.982957	0.972897
5 FLECTRICAL POWER	0.985701	0.984194	0.982709	0.974222	0.959115
TATTDATA HANDITE COMMIT	0.978539	0.976286	0.974068	0.961424	0.939056
7 PRIMARY OPTICS	0.992372	0.991565	0.990770	0.986211	0.978051
8 DOCKING MECH.	0.985521	0.983995	0.982492	0.973900	0.958608
9 PNEUMATICS	0.978717	0.976483	0.974283	0.961742	0.939552
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AVAILABILITY GOALS	0.560000	0.923711	0.914286	0.905050	0.896000
NO ITEM NAME		AVAILA		MENTS	· · · · · · · · · · · · · · · · · · ·
1 EXPERTMENT	0.973723	0.996362	0.995893	0.995429	0.994969
" ? STABIL. E CONTROL"	0.940834	0.991688	0.990618	0.989561	0.988516
3 THERMAL	0.931186	0.990290	0.989042	0.987808	0.986588
4 STRUCTURE	0.956315	0 - 99 39 0 5	0.993120	0.992344	0.991576
5 ELFCTRICAL POWER	0.934391	0.990755	0.989567	0.988392	0.987230
6 DATA HAND. & COMM.	0.902831	0.986107	0.984326	0.982566	, 0.980826
7 PRIMARY OPTICS	0.964565	0.995075	0.994440	0.993812	0.993190
8 DOCKING MECH.	0.933589	0.990639	0.989435	0.988246	0.987069
9 PNEUMATICS	0.903607	0.986223	0.984457	0.982711	0.980986
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LARGE	SPACE TELESCOPE	(LST) MISSION SU	CCESS APPORTIONMENT		A distance of the second secon	
The street back promoted date qualification and the street of the street		· - •				-
. AVAILABILITY GOALS .	0.887129	0.878431	0.829630	0.746667	0.622222	
NO. ITEM NAME	* * * * * * * * * * * * * * * * * * * *	AVAILA	BILITY APPORTION	MENTS		
t EXPERIMENT	0.994515	0.994065	0.991459	0.986673	0.978446	
? STABIL & CONTROL	0.987481	0.986459	0.980546	0.969739 -	0.951319	
3 THERMAL	0.985381	0.984188	0.977295	0.964716	0.943328	•
4 STRUCTURE	0.990816	0 • 990064	0.985714	0.977746	0.964109	2 mm
5 FLÉCTRICAL POWER	0.986081	0.984944	0.978378	0.966387	0.945984	,
6 DATA HAND. E COMM.	0.979107	0.977408	0.967608	0.949801	0.919758	
7 PRIMARY OPTICS	0.992576	0.991967	0.988446	0.981987	0.970910	
8 DOCKING MECH.	0.985906	0.984755	0.978107	0.965969	0.945320	••
9 PNEUMATICS	0.979281	0.977596	0.967876	0.950212	0.920404	
			- 2000000 47		Andrew Communication and the Communication of the State o	-
		- 4. ma + 17	* u - u - u - u - u - u - u - u - u - u	Applicable from the purpose of the contract of		
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OAO/LST/SHUTTLE M	ITRE	APPORTIONMENTS	A SPECIAL SECTION AND ASSESSMENT OF THE SECTION OF	
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LST MTTF	SHUTTLE DELAY	OTTAR RATIO	SURSYSTEM	MIBE APPORTION	NMENTS (IN HOURS)		
(MONTHS)	(MONTHS)	FOR SYSTEM	STABIL & CONT	ELECT. POWER	COMMIDATA HAND	PNEUMATICS	
3.0	0.5	0.799999952	107364.8	96492.2	64057.9	64600.9	**************************************
3.0	1.0	0.69999988	76765.4	68991.7	45801.3	46189.3	
3.0	1.5	0.622222304	64922•2	58347.8	38735.1	39063.4	t
3.0	2.0	0.550000063	59027.7	53050.2	35218.2	35516.7	
7.0	2.5	0.509091079	55764.0	50117.1	33271.0	33552.9	
3.0	3.0	0.466666639	51888•4	48431.3	32151.9	32424.3	
3.0	6.0	0.311111450	52762.5	47419.5	31480+1	31746.9	
3.0	12.0	0.186666667	61173.8	54979.0	36498•7	36808.0	
3.0	24.0	0.103703797	81553•1	73294.5	48657.7	49070-1	* *
6.0	0.5	0.861538410	298539.7	268307.6	178120.0	179529.6	·
5.0	1.0	0.799999952	214729.6	192984.6	128115.8	129201.7	
6.0	1.5	0.746666670	175733.1	157937.4	104849.1	105737.6	
6.0	2.0	0.69999988	153530.8	137983.4	91602.5	92378.6	Mark to be a second to the sec
6.0	2.5	0.658823729	139427.7	125308.4	83199.0	83893.0	·
6.0	3.0	0.622222364	129844.2	116695.5	77470.1	78126.7	
6.0	6.0	0.466565539	107776.7	96862+5	64303.7	64848.6	
6.0	12.0	0.31111152	105524.8	94838.8	62960.2	63493.8	
6.0	24.0	0.186666727	122347.7	109958-1	72997.3	73615.9	
9.0 "	0.5	0.884210527	529427.5	474914.1	315279.8	317951.4	
9.0	1.0	0.840000033	392597.3	352841.0	234239.1	236224.2	
9.0	1.5	0.799999952	322094.4	289476.9	192173.7	193802.6	
9.0	2.0	0.763636410	279221.4	250945.6	166594 • 1	168006.0	
7.0	-2.5	0.730434935	250603.3	225225.7	149519.6	150796.6	
0.0	3.0	0.69999998	230296.2	206975.1	137403.8	138568.0	
V 9.0 -	6.0	0.560000002	177083.1	159150.7	105654.7	106550.1	
9.0	12.0	0.399999976	156878.7	140992.2	93599.9	94393.1	
9.0	24.0 -	0.254545450	165089.1	148371.2	98498.5	99333.2	V 40 10 V 40 40 - MARK
12.0	0.5	0.895999969	779160.3	700257.6	464877.3	468816.6	
12.0	1.0	0.861538410	597079.4	536615.2	356240.1	359259.2	
	1.5	0.829629660	494756.4	444654.6	295190.4	297692.2	i
12.0		0.799999952	429459.2	385969+2	256231.6	259403.4	
12.0	2.0		384353.9	345431.5	229320.4	231263.8	
12.0		0.772413790 _ 	351466.1	315874.9	209693•2	211475.2	and the second s
12.0	3.0		259648.6	213391.0	154940.3	156253.4	•
12.0	6.0	0.622222304	215553.4	1937725.0	129607.4	129597.2	and the second s
12.0	12.0		211049.7	189677.6	125920.4	126987.6	
12.0	24.0	0.311111152	1042405.0	936845.2	621938 • 1	627208.4	
15.0	0.5	0.903225780		737133.6	489357.6	493504.7	
15.0	1.0	0.875000000	820192.6 687410.1	617799+6	410135.1	413611.1	76.5 F U
15.0	1.5	0.948484755		538651.1	357591.6	360622.7	
15.0		0.823529422	599343.6	482401.5	320299.6	323004.2	
15.0	2.5	0.800000072	536824.1		292512.7	294991.0	
15.0	3.0	0.777777851	490268.1	440620.3	211522.1	213314.3	
15.0	6.0	0.666666627	354522.6	318621.4		169316.4	
15.0	12.0	0.518518567	281399.2	252702.4	167893.5		<u>.</u>
15.0	24.0	0.358974457	260572.8	234185.7	155457.8	156785.4 790472.0	
19+0		0.908108056	1313739.0	1180704.0	783328.6	635902.9	a has prior accord to according our age tops attached to the
18.0	1.0	0.984210408	1054850.0	949829.1	630558.0		
1 B • O	1.5	0.961538410	895619.2	904922.9	534360.1	538989.8	
13.0 18.0	?•0 2•5	0.940000033 0.819512248	785194.7 704982.1	705/42.0 :633593.1	468478.2 420620.2	472448.4 424184.6	

18.0 18.0							
18.0	3.0	0.799999952	544188.9	578455.7	244741.2	39/009+1	
	6.0	0.69999988	460592+6	413950.3	274807.6	277136.0	
18.0	12.0	0.560000062	354166.1	318301.5	211309.4	213100.1	ſ'
18.0	24.0	0.399999976	313757.4	2819844	187199.8	188786.1	
21.0	` ิด•ร ี๊๊	0.911627829	1590619.0	1429536.0	949022.4	957063.2	
21.0	1.0	0.890909016	1303676.0	1171657.0	777824.9	784415.6	
21.0	1.5	0.871111035	1116158.0	1003129.4	665943.2	671597.6	
21.0	2.0	0.852173865	984197.4	884529.4	587209.6	592186.0	
21.0	2.5	0.834042609	886419.2	796656.7	528871.9	533353.7	
21.0	3.0	0.81666663	811171.8	729025.2	483976 • 1	488077.8	
21.0	6.0	0.725925922	576998.6	518569+6	344259.9	347177.4	
21.0	12.0	0.593939424	433582.9	389676 • 1	258692.7	260885.1	
21.0	24.0	0.435555637	370612.4	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	221121.7	222995.7	
24.0	0.5	0.914285560	1871445.0	1681931.0	1116575.0	1126039.0	
24.0	1.0	0.89599968	1558320.0	1400515.0	929754.6	937633.2	
24.0	1.5	0.878431320	1346647.0	1210281.0	803463.9	810272.6	
24.0	2.0	0.861538410	1194158.0	1073230.0	712480.1	718518 4	
	2.5	0.845282972	1079190.0	96990746	643887.6	649344.2	
24.0		0.829629660	989512.9	882309.1	590380.9	595384.6	
24.0		0.746666670	702932.2	631749+8	419396•4	422950.6	
_24 • 0	6.0		519377.2	466782.1	309880.6	312506.8	2 have a specific to the second secon
24.0	12.0	0.622222304	431106.8	387450 • 1	257214.8	259394.6	
_24.0	24.0	0.466666639	3017953.0	2712347.0	1800626.0	1815886.0	
36.0	0.5	0.920547903		2361408.0	1567657.0	1580944.0	
36.0		0.908108056	2627476.0		1394631.0	1406449•0	
36.0	1.5	0.895999968	2337481.0	2100773.0	1261116.0	1271805.0	
36.0	2.0	0.884210408	2113700.0	1899656.0	1155020.0	1164805.0	
36.0	2.5	0.872727156	1935875.0	1739839.0		1077777.0	
36.0	3.0	0,861539410	1791238.0	1609845.0	1068720.0 768695.0	775210.2	
36.0	6.0	0.79999998	1288377.0	1157907.0		554272.0	
36.0	12.0	0.699999988	921185.1	827900.7	549615.3	426200.2	
36.0	24.0	0.560000062	708332+3	636603.0	422618.8		
48.0	0.5	0.923711300	4183527.0	3759870.0	2496048.0	2517200.0	
49.0	1.0	0.914285660	3742990.0	3363863.0	2233150.0	2252079.0	
48.0	1.5	0.905050457_	3396316+0	3052377.0	2026366.0	2043543.0	- The state of the
49.0	2.0	ñ • 895999968 T	3116641.0	2301030.0	1859509.0	1875266.0	
48.0	2.5	0.887128651	2886278.0	2594001.0	1722068.0	1736658.0	The state of the s
49.0	3.0	0.978431320	~~ 2693294.0 ~~	~~~2420563.0	1606927.0	1620545.0	
49.0	6.0	0.829629660	1979025+0	1778618.0	1180761.0	1190769.0	
43.0	13.0	0.746566670	1405864.0	1263499.0	938792.7 619761.2	845901.1 625013.6	

7 MARKET MARKET

Appendix Subsection 3B

Multi-state Effectiveness Analytical Technique

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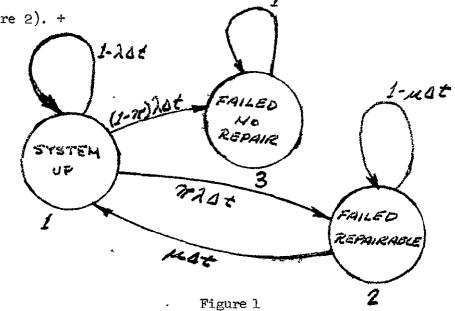
ANALYTICAL TECHNIQUE AND SAMPLE PROBLEM:

In order to aid in the understanding of the analytical approach suggested for this study, the following simple example is presented. Consider a system composed of one vehicle with failure rate (λ); repair rate (μ) and repair percentage (). The states for this system can be given as:

- (1) The vehicle is up.
- The vehicle is down with a failure which can be repaired.
- (3) The vehicle is down with a failure which cannot be repaired.

It can readily be seen that the vehicle cannot be in more than one of these states at any time (mutually exclusive states) and that there are no other possible states (at least for the present scope of the problem) in which the vehicle can be (mutually exhaustive states). *

The problem can now be represented by the state transition diagram given below (Figure 2). +



- See Definitions Section for detailed definitions.
- In order to simplify the state diagrams utilized in this study the "self loops" and ∆t factors were eliminated in the figures for Shuttle via Titan Systems. 48

The directed edges between states in Figure 1 indicate the approximate probability of making a transition from state "i" to state "j" (e.g. 1-2) in the small time interval Δt given that we start in state "i" at time "t". Thus the probability of being in a specific state at a time "t + Δt " is equal to the probability of being there at time "t" and remaining until "t + Δt "; plus the probability of being in another state at time "t" making a transition in " Δt " and ending there at "t + Δt ". Specifically if we can write the probability that we are in state 2 at time "t + Δt " as:

Rearranging terms we obtain:

Taking the limit on both sides as $\Delta t \rightarrow 0$ (and thus replacing our approximation with the exact answer) we obtain:

$$\frac{dR(t)}{dt} = R(t) = R\lambda R(t) - \mu R(t)$$

In a similar manner we obtain the following set of differential equations:

$$P_{j}(t) = -\lambda P_{j}(t) + \mu P_{j}(t)$$

$$P_{j}(t) = \pi \lambda P_{j}(t) - \mu P_{j}(t)$$

$$P_{j}(t) = (1-\pi)\lambda P_{j}(t)$$

The above set of differential equations can be written in matrix form as:

$$\begin{vmatrix}
\dot{P}_{1}(t) \\
\dot{P}_{2}(t) \\
\dot{P}_{3}(t)
\end{vmatrix} = \begin{vmatrix}
-\lambda & \mu & 0 \\
\pi\lambda & -\mu & 0 \\
(1-\pi)\lambda & 0 & 0
\end{vmatrix} = \begin{vmatrix}
P_{1}(t) \\
P_{2}(t) \\
P_{3}(t)
\end{vmatrix}$$

or alternately:

$$[\dot{P}(t)] = [A][P(t)]$$

where (P(t)) is the current state vector and (A) is just the transpose of the transition matrix (M). That is:

implying that:
$$\begin{bmatrix}
A \end{bmatrix} = \begin{bmatrix}
M
\end{bmatrix}$$

$$\begin{bmatrix}
-\lambda & \pi\lambda & (i-\pi)\lambda
\end{bmatrix}$$

$$\begin{bmatrix}
M
\end{bmatrix} = \begin{bmatrix}
-\lambda & \pi\lambda & (i-\pi)\lambda
\end{bmatrix}$$

Notice that the matrix (A) is a stocastic matrix, that is the sum of the column elements equals zero. This is true for all matrices involved in problems of this type.

The difficulty now results in solving the matrix equation. One method of solving the problem exactly is to take the Laplace transform of each of the individual equations to yield a set of linear homogenous algebraic equations which are then solved by standard techniques, and then take the inverse transform. This technique is exact, however, the solutions are exceedingly difficult to obtain especially if the number of states is large. (Solving this simple 3 state problem using this technique will show the difficulties involved).

Another technique is to write the matrix equation as a simple differential equation implying solutions of the form:

$$[P(t)] = EXP \{t[A]\}[P(0)]$$

where (P(0)) is the initial condition vector and $e^{t(A)}$ given by:

Here the answer is approximated by taking a number of terms of the series.

This solution, however, converges slowly for large mission times so a large number of terms must be used - thus it is not considered suitable for our application.

A third method of solution for the problem is given in Reference (b) and involves the use of a matrix of the form:

$$[N]_{\Delta t} = [A]^{T} - [I]$$
or
$$[A]^{T} = [I] + [N]_{\Delta t}$$
or
$$[M] = [I] + [N]_{\Delta t}$$

Where λ t is of the order of 1 x 10⁻³ and then raising the matrix to a very high power ($\frac{9}{2}$ 10⁵) to bring the time within the range of the mission time. This method converges very rapidly and has been programmed and used successfully for problems with as many as 50 states and mission times approaching twenty years. Because of the above attributes, the method explained in Reference (b) was used in this study.

DEFINITIONS:

(a) Multi-State effectiveness Markov Models -

This is the technique suggested to mathematically model the proposed vehicles and missions. These models break down the vehicles' interaction for each phase of the mission into mutually exclusive and mutually exhaustive states. Transitions <u>from</u> individual states to other states in the model are indicated by the product of the failure rate (λ) and the repair percentage (π) for repairable failures, and by the product $(1-\pi)\lambda$ for non-repairable failures (See Figures 2 & 3). Transitions to individual states from other states are indicated by the repair rate (μ) .

(b) System State -

A state of a system is a collection of failure and successful events describing a particular system condition. (See Figures 2 & 3).

(c) Mutually Exclusive States -

As set of system states is mutually exclusive if the intersection of each state in the set with all other states is the null set (i.e. \emptyset = set containing no elements). This condition constrains the model so that the system cannot be in more than one state at any time.

(d) Mutually Exhaustive States -

A set of system states is mutually exhaustive if the union of this set with the set of all possible system states is the set itself. This condition constrains the problem so that the system can be in no state other than the set of states given in the model.

DEFINITIONS - (Continued)

(e) Repair Percentage ($\hat{\pi}$) -

The fraction of all possible failures which can occur on the vehicle which can be repaired is the repair percentage. Thus if it is known that on a particular vehicle 9 out of 10 failures which may occur can be repaired, the repair percentage for that particular vehicle is .90.

(f) Initial Condition Vector (P(t_o)) -

The vector containing the initial probability of being in each of the "N" states at the start of the problem (i.e. at t = to) as its "N" components is called the initial condition vector. The initial condition vector is usually taken to be, $(1,0,0,\ldots,0)$ implying that the system started in the all up condition.

(g) Current State Vector (P(t)) -

The vector containing the probability of being in each of the "N" states at a current time "t" is called the current state vector.

(h) Transition Matrix (M) -

The matrix containing the transition rate from state "i" to state "j" as its (i j)th element is called the transition matrix.

Appendix Subsection 3C

Multi-state Effectiveness Computer Output Summary



	WITH SHUTTLE	_
	THIS IS CASE NUMBER 2	•
	THE TRANSPORT OF THE PROPERTY	
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0.10000E-	01 0.1C000F-01 0.10000E-01 0.10000E-01	
	THE INITIAL CONDITION VECTOR IS -	
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	STATE 2 = 0.0	
	STATE 3 = 0.0	<u>.</u>
_	STATE 4 = 0.0	
	STATE 5 = 0.0	
	STATE 6 = 0.0	-
- [J]	STATE 7 = 0.0	
	STATE E = 0.0	
	STATE 9 = 0.0	-
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PI	IASE _3_=4380.00 HOURS	
bł	ASE 5 = 4380.00 HOURS	
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P1	NASE 7 = 4380.00 HDURS	
וט	ASE '8 = 4380.00 HOURS	•
Pi	ASF 9 = 4380.00 HOURS IASE 10 = 4380.00 HOURS	
	IASE 11 = 4380.00 HOURS	
	ASC 12 = 4300.00 HOURS	

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	TATE 2 = 0.0366							
	TATE 2 = 0.0007							
	TATE 4 = 0.0000							
	TATE 5 = 0.0000			•				
	TATE 6 = 0.0000							
	TATE 7 = 0.0000			, 	· · · · · · · · · · · · · · · · · · ·		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	4
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. •	TATE 9 = 0.0000		•					
, s	TATE 10 = 0.0014							
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WHEN G IS 1, THE STATE VECTOR IS 0	
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STATE 3 = 0.0007	•
STATE 4 = 0.0000	
STATE 5 = 0.0000	
STATE 6 = 0.0000	
STATE 7 = 0.0000	
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STATE 10 = 0.0000	
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		00233459			•		•
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_0.0	0.79552E-07				_	01.4400 <u>L</u> 0.	
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0 - 10 000E 00	C • 0	0.0	0.0	0.0	0.0	0.0	0.0
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MODE MODE MODE O.99501E OO O.694805-72 O.0 O.0 O.926415-65 O.18110E-68 O.82874F-66	ME IN RUN - 1 = 1. 2 = 0. 3 = 0. 0.42288E-02 0.29146F-04 C.9950IE 00 C.49875E-02 0.13273E-67 C.48890E-01 C.11772E-68	0.00 0.00 0.70563E-03	0.0	0.19020E-05	0.63846F-06 0.0	0.16115E-05 0.0	0.0
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MODE MODE MODE MODE MODE 0.99501E 00 0.69480E-72 0.0 0.926415-65 0.18110E-08 0.82874F-66 0.164845-69 0.82874F-66 0.164845-69 0.82874E-66 0.164845-69 0.82874E-66	[ME IN RUN - 1.	0.20199E-69	0.0 0.54120E-02 0.99812E-01 0.51148E-72 0.51148F-72	0.19020E-05 0.0 0.57472E-02 0.42832E 00 0.31397E 00 0.20754E-72	0.63846F-06 0.0 0.29000F-02 0.45949E 00 0.67365F 0C 0.96762F 00	0.16115E-05 0.0 0.42097E-02 0.44031E-02 0.44031E-02	0.0 0.44164F-01 0.24066F-71 0.24066F-71
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	STATE 2 = 0.0366						
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0.0	0.42500E-07	0.75000E-08	0.0	0.0	0.0	0.0	0.0
0.0	0.10000E-13_ C.0	0.0	0.0				
0.0	C,50000 <u>F-07</u>	0.0	0.0	0.0	0.0	0.0	0.0
0 • 0 0 • 0	C.O C.50954E-06	0.0	0.15000E-06	0.0	0.0	0.45000E-07	0.47568E-06
0.0	0.0	0.0	0.0	0.22920E-04	0.0	0.45000E-07	0.0
0.0	0.79552E-07 0.0	0.0	0.0	0.0	0.11460E~04	0 • 4 50 00E-07	
0.0	C - 79552E- C7						0.0
0.0	C.O 0.79552F-07	0.0	0.0	0.0	0.0	0.45000E-07	0.0
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0,69480F <u>-72</u>	0,29146E-04 0,99501E 00	0.0	0.0) .
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0.82874E-66	0.117725-68	0.201995-69	, 0.99812F-01	0.42832E 00	0.45949E 00	0.44031E-02	0. 24 066E-71
0 • 16 48 45 - 69 0 • 82 37 45 - 66	_ C,7974P=_02 0~11772F=68	0.201995-69	0.611495-72	·			
	. 0.79748E-02		0.51148E-72	0.31397E 00	0.67365E 00	0.44031E-02	0. 24 066E-71
0.16484E-69	. 0.117725-68	0.20199E-69	0.51148E-72	0.20754E-72	0.98762€ 00	0.44031E-02	0.24066E-71
0.16484E-69 0.82874E-66							
0.16484E-69 0.82874E-66 	0.7974FE-02 _ 0@78465E-66	0.13338F-66	0.41278E-69	0.20766E-69	0 • 52856E- 70	0.96937E 00	0.21252E-6B
0.16484E-69 0.82874E-66 0.16484E-69 \ 0.36769F-63	0,7974FE-02 0,7846SE-66 0,3062FE-01				45.4		
0.16484E-69 0.82874E-66 	0.7974FE-02 _ 0@78465E-66	0.13338F-66 0.13338F-66 0.70556F-C3	0.41278E-69 0.41278F-69 0.28374F-05	0 • 20766F-69 0 • 20766F-69	0.52856E-70 0.52856F-70	0.20180F-69	0.21252E-68 0.96937F 00

0.0	C+10000E 01		0.0	0.0	0.0	0.0	
	WHEN G IS 1. THE STATE VECTOR I	15 0				·	
	STATE 1 = 0.9448					<u> </u>	
,, 	STATE 2 = 0.0519	<u> </u>					
	STATE 3 = 0.0007			•			
 	STATE 4 = 0.0000.			······································			
	STATE 5 = 0.0000				· · · · · · · · · · · · · · · · · · ·		<u></u>
	STATE 6 = 0.0000						<u> </u>
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	STATE 8 = 0.0000						
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	3		2246360	3	0.000243090	•		
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	8		0221683					· · · · · · · · · · · · · · · · · · ·
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	7. □ 1	PODERTED TIME I	N HODE 1 ECC TH	4 C DU ACE -	4319.97			
	0 • 0	0.42500E-C7	N_MODE_1_FCE_TH 0.7500CE-08	0.0	0.0	0 • 0	0.0	0.0
	_0.•0	_C.12920E=13_	01130000 00					
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0 •0	0.500005-07						
	0 , 0	0.0	0.0	0.15000E-06	0.0	0.0	0.45000[-07	0. 47568E-06
	0.0	0.50954 <u>E06</u>						
	0.0	-0.0	0.0	0.0	0.22920E-04	0.0	0.45000E+07	0. 0
	0 • 0			0.0	0.0	0.11460E-04	0.45000E-07	0.0
	0.0	0.0	0.0	0.0	0.0	0 11 4 50 2 - 0 4	0.430002-07	•••
. ————	0.0	_0.79552 <u>E-07</u> 0.0	0.0	0.0	0.0	0.0	0.45000E-07	0.0
	0.0	0.79552E-C7	***	***			3	*
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0. 0
	0 • 37.441 E-68	C.31107E-06						
	0.0	C.O	0.0	0.0	0.0	0.0	0.0 ',	0.0
	0.37441E=68							
	0.10000E 00	C • O	0.0	0.0	0.0	0.0	0.0	· · · · · · · · · · · · · · · · · · ·
	0.0	C.O	0.0	0.0	0.0	0.0	0.0	0.0
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	MIDE	_3, =, V±	V					
	MODE	4 = 0.	0.0					
~	0.99501F 00	0.42288E-02	0.70563E-03	0.28378E-05	0.19020E-05	0.63846E-06	0.16115E-05	0.16949E-04
	0.69480E-72	C.2914CF-04		<u> </u>				
	0 • 0	C.99501E 00	0.0	0.0	0.0	0 • 0	0.0	0.0
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	0 -92041F-65	0.132735-67	0.898686 00	0.54120E-02	0.57472F-02	0.29000E-02	0.420996-02	0.44164E-01
	0.18110E-68	C.48890F~01 _			0 420705 00	0 450405 00	0.44031E-02	0.24066F-71
	0.82874E-60	0.117721~69	0.20199E-69	0.99812E-01	0.42B32E 00	0.45949E 00	3444316-06	J, 2, 3001
	0 • 16 484E- (9	C+79748E-02 0+11772E-68	0.20199E-69	0.51148E-72	.0.31397E 00	0.67365F 00	0.44031E-02	0.2406F-71
	0.82874E-66 0.16484E-69	. C.7974 PF-02 _	292013300-14	040114011				
	0.823745-66	20.11772E-68	0.20199E-69	0.51148E-72	0.20754E-72	0.98762E 00	0.440316-02	0-24066E-71
	0.164845~69.	0.797485-02						*** *** *** *** ****
	0.36769E-63	0.78465E-66	0.13338F-66	0.41278E-69	0.207660-69	0.528561-70	0.96937E 00	0.21252F-68 ·
	0.362956~67	0.3062 FC =		•	•		····	
	0.36769E-63	C+78405	0.13338E-66	0.41278E-69	0.20766E-69	0.52856[-70	0.201805-69	0.969370 00
-	0 • 36 295E- 67	0.30628		0.001747	0.190166-05	0.670.045.04	A 161505-AF	04 1 6 94 GF = 04
	0.99501[00	0.423441-02	0.705561-03	0.293740-05	0.120106-02	0.638240-06	0.16112F-05	Q# 1 to 5d (t) O d

0.0	0.29140E-04	C.O.	0.0	<u> </u>	0.0	0.0	0,0	
0.0	0.10000E 01		1				-	
1	WHEN G IS 1. THE ST	TATE VECTOR I	IS O		 ·			
	STATE 1 = 0.9287		**************************************					
:	STATE 2 = 0.0667							f
	STATE 3 = 0.0007		*					,
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1		4838374	1	0.994381368			
2		7335060	5	0.000070483			
3	0.00	2207938	3	0.000238932			
4_	0.00	0013101	44	0.005308997			
5	0.00	0020481					
6_		0 0 3 6 9 0 2					
7		0021041					
		021 7891 0000000					
10							
	XPECTED TIME I	N MODE I FOR TH	IS_PHASE =	4313.36			
0.0	0.42500E-07	0.75000E-08	0.0	0.0	0.0	0 • 0	0.0
_0 •0	0 • 1,00 <u>0 QF1 3.</u>				^ 0	0.0	0.0
0.0	C.O	0.0	0.0	0.0	0.0	0 • ÿ	
0.0	C.5000CF-07	70.0	0.15000E-06	0.0	0.0	0.45000F-07	0.47568E-06
0.0	C.O C.50954=-06	,	VVVVV	V - V			
0.0	. 6.30334	0.0	0.0	0.22920E-04	0.0	0.45000E-07	0.0
0 •0	0.79552E-07						
0.0	0.0	0.0	0.0	0.0	0.11460F-04	0 • 45000E-07	0. 0
0.0	C.79552E-07						
0.0	0.0	0.0	0.0	0.0	0.0	0.45000E-07	0.0
_ 0 • 0	_ C.79552E=07			0.0	0.0	0.0	0.0
0.0	C+0	0.0	0.0	0.0	0.0	0.0	
0 • 37441 E68	0.31107E=_06 0.0	0.0	0.0	0.0	0.0	0.0	0. 0
.0•0 0•374415-68		0.0		***			
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	MF 1N RUN - 0. 1. = 0. 2 = 0. 3 = 0. 4 = 0. 0.42288E-02;	99 0 0				0.16115E-05	0, 16,949E-04
	MF IN RUN - 0. 1 = 0. 2 = 0. 3 = 0. 4 = 0. 0.42288E-02; C.29146E-04	0	0.28378E-05	0.190206-05	0.63846E-06	0.16115E-05	
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	STATE 2 = 0.0944							
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	وروانت فللنفث المقادمات فللناش المقللة الروا والتقاليون ويوبو الزرق					<u> </u>		
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MODE MODE MODE 0.99501E 00 0.69480E=72 0.0 0.0 0.92641E-65 0.18110E-68 0.82874E-66	l =	0.70563E-03	0.28378E-05	0.19020E-05	0.63846F-06	0.16115F-05	0.16949E-04
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MODE MODE MODE MODE 0.99501E 00 0.69480E=72 0.0 0.92641E-65 0.18110E-68 0.82874E-66 0.16484E-69 0.82874F-66 0.16484E-69 0.82674F-66 0.16484E-69 0.36769E-63 0.36295E-67	1 =	0.20199E-69 0.13338E-66	0.28378E-05 0.0 0.54120E-02 0.99812E-01 0.51148F-72 0.51148F-72 0.41278E-69	0.19020E-05 0.0 0.57472E-02 0.42832E 00 0.31397E 00 0.20754E-72 0.20766F-69	0.63846F-06 0.0 0.29000E-02 0.45949E 00 0.67365F 00 0.98762E 00 0.52856F-70	0.16115F-05 0.0 0.42099E-02 0.44031E-02 0.44031F-02	0.16949E-04 0.0 0.44164E-01 0.24066E-71 0.24066F-71 0.21252F-68
MODE MODE MODE MODE 0.99501E 00 0.69480E=72 0.0 0.92641E-65 0.18110E-68 0.82874E-68 0.16484E-69 0.82674F-66 0.16484E-69 0.82674F-66 0.16484E-69 0.36769E-63	1 =	0.20199E-69 0.13338E-66	0.28378E-05 0.0 0.54120F-02 0.99812E-01 0.51148F-72 0.51148F-72	0.19020E-05 0.0 0.57472E-02 0.42832E 00 0.31397E 00 0.20754E-72	0.63846F-06 0.0 0.29000E-02 0.45949E 00 0.67365F 00 0.98762E 00	0.16115F-05 0.0 0.42099E-02 0.44031E-02 0.44031F-02 0.44031E-02	0.16949E-04 0.0 0.44164E-01 0.24066E-71 0.24066F-71 0.21252F-68

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		2 = 0.1322						
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14 1 v.m. man, 1 v.m.			What she is distinguished troops appear may					

AT TIME = 4000.00 END CF PHASE 10 TEAL TEAL 3999999999999999999999999999999999999	,
1 0.839233398 1 0.982177436 2 0.140918612 2 0.000064659 3 0.002025468 3 0.000219186 4 0.000012018 4 0.017538521 5 0.0000338752 6 0.0000338752 7 0.000019302 8 0.000195884 9 0.000000000 10 0.017538521	'
3 0.02025468 3 0.000219186 4 0.000012018 4 0.017538521 5 0.000018788 6 0.000033852 7 0.000019302 8 0.000199884 9 0.000000000 10 0.017538521	'
4 0.000012018 4 0.017538521 5 0.000018788 6 0.000033852 7 0.000019302 8 0.0000199884 9 0.000000000 10 0.017538521	
5 0.000016788 6 0.00033852 7 0.000019302 B 0.000199884 9 0.000000000 10 0.017538521	
6 0.00C033F52 . 7 0.00C19302 . B 0.00C199884 9 0.0000C0000 10 0.017538521	
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100.017538521	ć.
THE EXPECTED TIME IN MODE 1 FOR THIS PHASE = 4262.93	
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0.0 . 0.0 0.0 0.0 0.0 0.0	0.0
0 • 37441E-68 C • 31107F-Cb	
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0.37441E-680.31107E=06	
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AT TIME IN RUN - 39099.99	
AT TIME IN RUN - 39099.99	
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	AND DESCRIPTION OF THE PARTY AND ADDRESS OF THE PARTY OF
MODE 4 = 0.02	
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0.99501F 00	0. 0. 44164E-01
0.99501F 00	0. 44164E-01 0. 24066E-71 0. 24066E-71
0.99501F 00	0.44164E-01 0.24066E-71
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0.99501F 00	0. 44164E-01 0. 24066E-71 0. 24066E-71
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0.0		0		0.0	0.0	0.0	
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WHEN	G IS 1. THE STATE	VECTOR IS 0					
STAT	E 1 = 0.8373						
STAT	E 2 = 0.143P						
STAT	E 3 = 0.0006						
STAT	E 4 = 0.0000						
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NAI 1		00.00 END CF PROB.	PHASE - TITCTAL MCDE NC. M	TIM\ 439 CCE PROB•	99,99		
1		24879289	f	0.979021072			
		52150989	2	0.000063553			
	0.0	01990824	3	0.000215437		· · · · · · · · · · · · · · · · · · ·	
4	0.00	00011812	44	0.020699769			
5		00018467					
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7		0018972		•			
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		IN MODE I FOR T	ILS PHASE =	4249.68			
0.0	0.4250 CE-07	0.75000E-08	0.0	0.0	0.0	0.0	0.0
0.0	Ç.100000E-13					····	
0.0	0.0 0.5000CE-07	0.0	0.0	0.0	0.0	0.0	0. 0
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0 •0	0.50954F-06	'	0.150005-00	0.0	0.0	0.45000E-07	0.47568E-06
0.0	0.0	0.0	0.0	0.22920F-04	0.0	0.45000E-07	0.0
0.0	0.79552F-07		• • •	0 722 7200 04	0.0	0.420005-01	0. 0
0.0	0.0	0.0	0.0	0.0	0.11460E-04	0.45000E-07	0. 0
0 • 0 •	C.79552F-07						•
0.0	0.0	0.0	0.0	0.0	0.0	0.45000E-07	0.0
0.0	0.79552E~07						
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.31107F-06	0.0	0.0				
0.37441E-68	0.31107E06	0.0	0.0	0.0	0.0	0.0	0. 0
0.100000 00	C.O	0.0	0.0	0.0	0.0	0.0	0,0
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0 •69480E-7?							,
	0.99501E 00	0.0	0.0	0.0	0.0	0.0	0.0
	_C.49875E-02					, , ,	
	0.132735-67	0.89868E 00	0.54120E-02	0.57472E-02	0.29000F-02	0.42099E-02	0.44164E-01
0+131105-68 0+82874E-66	_ C.48890F-01 O.11772E-68	0.20199E-69		سساب وويوبس			
	_ 0 • 79748E-02	0.701996-69	0.99812F-01	0.42832E 00	0.45949E 00	0.44031F-02	0. 24 06 bE-71
0.829745-66	0.11772E=69	0.20199E-69	0.611405-70				The property and the state of the second of
	_ C.797485-02,	201346-03	0.51148E-72	0.31397E 00	0.67365F 00	0-44031E-02	0. 24 066E-71
0.828745-66	0.11772E-68	0.20199E-69	0.51148E-72	0.20754E-72	0.087625 00	0 440315-02	0.00000
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0.367695-43	0.784655-66	0.13336E-66	0.41278E-69	0.207666-69	0 • 52856E - 70	0.96937E 00	0.212525-46
762955-67	_ 10-79520F.01					V470737E 00	0. 21252E-66
0 +307698-63	0,784659-66	0.13378E-66	0.41278E-69	0.207665-69	0 • 52856E- 70	0.20180E-69	0. 96937F 00
0.362955-67						2 1 2 0 1 0 0 E = 0 3	V■ 2039 LC . O.O.
0.995015 00	C • 42284F = 02	0.70556E-C3	0.283741-05	0.19016F-05	0.63824E-06	0.16112F-05	0.16946F-04
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WITHOUT SHUTTLE	
THIS IS CASE NUMBER 1	
N MAXRUN MAXPHS MAXSUB NMODE	<u> </u>
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THE H VALUES FOR EACH PHASE ARE	
THE-INIT-IAL-GONDI-TION-VEC-FOR-IS	
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1 0 0	
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	WHEN G IS	1, THE STATE VECTOR I	s o		— Maria (MAT 1997 1977) 77 - 7
	STATE 1 =	0.8230			
	STATE 2 =				A A A A A A A A A A A A A A A A A A A
*	STATE 3 =	0.0006	<u></u>		
	STATE 4 =				*
	STATE 5 =	0.0000			A SAMESTA STATE STATE STATE OF THE STATE OF
	STATE 6 =	0.0000			
	STATE 7 =	0.0000			
,	STATE E =			No.	h
	STATE 9 =			NOT REPRODUCIBLE	
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an 45					, , , , , , , , , , , , , , , , , , , ,
			= DHASE - 12TC1	TAI TIME 47009.99	
	AT TIME =	4000.00 END CF	= PHASE = 12TC1 MCDE_NO	TAL TIME - 47999.99 _MODE PROB.	
	AT TIME =	4000.00 END CF STATE PROB, 0.81C77C631	MCDE_NO	MODE PROB. 0.975648463	
	AT TIME =	4000.00 END CF STATE PROB, 0.81C77C631 0.162921071	MCDE_NO l 2 3	MODE PROB. 0.975648463 0.000062466 0.000211753	
	AT TIME =	4000.00 END CF STATE PROB. 0.81C77C631 0.162921071 0.001956774 0.000011610	MCDE_NO l 2 3	MODE PROB. 0.975648463	
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	AT TIME =STATE NO 123	4000.00 END CF STATE PROB. 0.81C77C631 0.162921071 0.001956774 0.000011610	MCDE_NO l 2 3	MODE PROB. 0.975648463 0.000062466 0.000211753	
	AT TIME =STATE NO 1 2 3 4 5 6 7	4000.00 END CF STATE PROB, 0.81C77C631 0.162921071 0.001956774 0.000011610 0.000018151 0.000032704 0.000018647 0.000193105	MCDE_NO l 2 3	MODE PROB. 0.975648463 0.000062466 0.000211753 0.024077088	
	AT TIME =STATE NO 1 2 3 4 5 6 7 8	4000.00 END CF STATE PROB, 0.81C77C631 0.162921071 0.001956774 0.000011610 0.000018151 0.000032704 0.000018647 0.000193105 0.00000000	MCDE_NO l 2 3	MODE PROB. 0.975648463 0.000062466 0.000211753 0.024077088	
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	AT TIME =STATE NO	4000.00 END CF STATE PROB. 0.81C77C631 0.162921071 0.001956774 0.000011610 0.000018151 0.000032704 0.000018647 0.000193105 0.000000000 0.024077C88	MCDE_NO。 1 2 	MODE PROB. 0.975648463 0.000062466 0.000211753 0.024077088	
	AT TIME =STATE NO	4000.00 END CF STATE PROB. 0.81C77C631 0.162921071 0.001956774 0.000011610 0.000018151 0.000032704 0.000018647 0.000193105 0.000000000 0.024077C88	MCDE_NO。 1 2 	MODE PROB. 0.975648463 0.000062466 0.000211753 0.024077088	
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0.0					0 - 3546 HF02		
. 0.0		0.0	0.78400F 00	0.16978E 00	0.321745-01	0.14051F-01	
70000					0.28684F 00		
0.0		0.0	0.0	0.0	0.98595F 00 0.0	0.14052F-01	
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•	STATE	1 = 0.9995	79-7 M. Let he	*** ** *** ****************************	+-	***** * *** **************************	**************************************
5		2 - 0 + 0 0 0 4					
* ****	STATE	- 3 = 0.0001					
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	STATE	4 = 0.0000					
r -			,		. ×		
	STATI	5 % 0 .0000					* * * * * * * * * * * * * * * * * * * *
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ء	STATE	6 = 0.0000°n					
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· ,	AT TI	18000	.00 FND OF P	HASE - ITOTAL	TIME - 18000	0.00	
	- STATE-1				OF-PROB		
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45			278490		0.029327799		gamente des activitàristations qualitàris qualification des productions de la company
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	T HF - E	EXPECTED-TIME -IN	N MODE- I-FOR-T+	HIS-PHASE-	17267.82			
0.0		0.50000F-08	0.0	0.0	0.0	0.10000E-14		
		0.0				0.14151F-06		
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0.99950		0.42019F-03	0.70524E-04	0.51767E-05	0.46545E-06	0.35206E-05		
0.0		0.69911F-00	0.25467500	0 ,-28627E-01	0 +-3546BE-02	0 • 1 40 51 F-0 1		
		0.0	0.78400E 00	0.16978E 00	0.32174F-01	0.14051F-01		
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	STATE NO.	STATE PROS.	MODE NO.	MODE PROB. 			
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	? 	0.001732768			· · · · · · · · · · · · · · · · · · ·		
	. 4	0.001111061	4	0.093756557			
	5	0.027144015				<u> </u>	
	6	0.093756557					
		ED TIME IN MODE 1 FO		25087.29			
		0.0 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000	0.0	0.0	0-10000E-14 0-14151E-06		
0.0	0.0		05 0.0 		0.14151E-06-		
	0.0	0.0	0.0	0.34380C-05	0.14151E-06		
-0.0 0.0	0.0	0.0			0 1-4 1 51 E 06	-	
0.0	0.0	0.0	0.0	0.0	0.0		
	AT TIME IN	RUN - 44699.99			,	· · · · · · · · · · · · · · · · · · ·	
4	40DF 1 =	1.00					
	MODE 2 =	0.0				NOT REPRODUCIBLE	
	1100E 3 =	0.0				REPRO	
	7000					OUCL	
	MDDE 4 =	0.0		A 1/5155 05-	0- 35206E-05		
0-,-49950		019F-030*70524E-		0746545E-06	0.14051F~01	\ '\\	
0.0		911F 00 0.25467E	00 0.28627F-01		-0.14051E-01		
0.0	······································		00-0.16978F-00 0.69911F 00		0.14051F-01	~	
0.0	7.0 	0.0	0.033116 00		-0.14052E-01-		
0.0	" 0.0	0.0	0.0	0.0	0.10000E 01		
	WHEN G IS	1. THE STATE VECTOR	IS 0				
			VA				
			· · · · · · · · · · · · · · · · · · ·				
	STATE 2 =	0.0004				<u> </u>	· · · · · · · · · · · · · · · · · · ·
	STATE 3 =	0.0001					
···· •	STATE 4 =	0.000			* ,		
•	STATE 5	0.000	4				
į at	STATE 6 =	0.0000				,*	
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	STATE NO	26699.99 FND OF 1				
]]	0.875027001	1 1	0.876250982		
	2	0.001223981	22	0.029987842		
	3	0.001732768	3	0.0		
	4	0.001111001	4	0 • 0 93 75 6557		
	5 c	0.027144015 0.093756557				
	THE EXPECTED 4	T-1-4F1N MODE-1-EOR-T	HIS-PHASE-=-	-25087.29		
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_0.0 	0.0	0.0	0.0		0.14151F-06	
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	-MODE 1 -=	1-+00				
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	111111111111111111111111111111111111111					
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	00 0.42019E		0.51767E-05		0.35206E-05	
		E-000.25467E-00-				
0.0	0.0	0.78400F 00	0.16978F 00	0.32174E-01	0.140515-01	
0.0	0.0	0.0	0.0	0.98595E 00	0.140526-01	
				0.0		
***	*	·				
	WHEN G IS 1T	THE STATE VECTOR IS	0			
		1HE- STATE VECTOR IS 1				
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	-STATE- 10:0	0004		,		
	-STATE- 10:0	0004		,		
	-STATE- 10:0	4995 		,		
	-STATE- 10:0	0001		,		
	-STATE 1-=-0:0 -STATE -2-=-0:0 -STATE -3 == 0:0 -STATE 4 == 0:0	0000				
	-STATE- 1 0:0 -STATE 2 0:0 STATE 3 0:0	0000				
	-STATE 1 = 0.0 STATE -2 = 0.0 STATE 4 = 0.0 -STATE -5 = 0.0	0000				
	-STATE 1 = 0.0 STATE -2 = 0.0 STATE 4 = 0.0 -STATE -5 = 0.0	0000				
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	-STATE 1 = 0.0 STATE -2 = 0.0 STATE 4 = 0.0 -STATE -5 = 0.0	0001				
	-STATE 1 = 0.0 STATE -2 = 0.0 STATE 4 = 0.0 -STATE -5 = 0.0	0001				

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	2		122 398 1	2	0.029987843			
	~ ·3		1732768				•	
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	5	0.02	7144015					
	6	0.09.	3756557					
		SCIED IIVE I	N MODE 1 FOR T	HIS DHASE =	25087.29			
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0.0		.0	0.0	0.0	0.34380F-05	0.14151E-06		
- 0.0		• 0		—-ი	0.0	04151E-06		4
0.0	O	• 0	0.0	0.0	0.0	0.0		
	AT T[WE	IN RUN -	98099.94					•
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	MODE 4			 		<u> </u>		
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0.0	c	.0	0.0	0.69911E 0		0.14051E-01		
-0.0 -			-0.0	0.0	<u>0.48595i00</u>	0.10000F 01		
0.0	C)•0 	0.0	0.0	0.0	0410000. 01		
	WHEN G	IS 1. THE ST	ATF VECTOR IS	0				
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	STATE	3 = 0.0001						
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	STATE	6 = 0.0000			· · · · · · · · · · · · · · · · · · ·		•	•
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	AT TIME = 2	6699.99 FND OF	PHASE - STOTAL	TIME - 12479	9.94		
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		.001223981		0.029987842			
	3 0	-001732768	3	0.0			
		.001111061		0.093756557			
		.027144015					
		.093756557	·				
	THE EXPECTED TIA				0.10000E-14		
0.0	0.50000E-0		0.0	0.0			
0.0					0.14151E-06	 	
0.0	0.0	0.0	0.22920E-05	0•0 0•34380 [- 05			
					0.14151E-06		
0.0	0.0	0.0	0 • 0				
0.0	0.0-	0.0	() • ()				
	AT 71.05 IN BUIL	124 200 04					
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	MODE1-=	_1_00					
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		- 0 - 0					
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	50E 00 0.42019F-0		0.51767E-05	0.46545E-06	0.35206E-05		
0.0			0.28627E-01-	0.35468F-02 -	0 • 1 4 0 5 1 E 0 1	NOT REDD	
0.0	0.0	0.79400E 00	0.16978E 00	0.32174E-01	0.140516-01	NOT REPRODUCIBLE	
			0.69911E-00-	0.28684E-00	0 • 1 4 0 5 t E - 0 t	- OIDLE	
0.0	0.0	0.0	0.0	0.98595E 00	0.14052E-01		
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		-STATE-VECTOR-IS	-0			•	
	STATE - 1 == 01999	5					
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		4					
	STATE -3 =-0.000	1					
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	STATE - 4-=-0.000	0				•	
				*		<u> </u>	
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		_					
	STATE - 6 = 0.000	0					
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		TATE PROT.	MODE NO.	MODE PROB.			
		-0-875027001		0.876250982 -			
	י	189555100.0	2	0.029987842			
		-0.001732768					
	4	0.001111061	4	0.093756557			
	. 5	0.027144015 -					
	٠ ٥	0.093756557					

Appendix Subsection 3D

Subsystem and Group Reliability Block Diagrams

						- - - -
SROUP I		GROUP LEVEL	FAILURE RATE	ANALYSIS		
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AIRCRAFT	+ -		┦╼┦╺┦╌┆╼┤╶┧╌┤╴┠╶┦			
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		<u>- </u>				• - -
PNEUMATICS	PRIMARY OPTICS	SPACECRAFT	THERMAL	ELECTRICAL &	STRUCTURE	
20/	1 21/1 1	MECHANISMS .	7-01	WIRING 2-0.2	7=00/	
	╀╌┠╼┼╾┟╼┧╴╏╼╏╴┞╸┞╼╏	╍┩╶┦╌┤┈╎╌╎╶┨╌┦╸╎╺┠╸┦	┋			
			<u> </u>			-
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\-\-\ <u>-</u> \-\-\-\-						
- ENEUMATICS	PRIMARY OPTICS	SPACECRAFT. MECHANISMS	THERMAL	ELECTRICAL É	STRUCTURE	+
	27	2: 9:01	7201	20.2		
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OTE ALL DARE IN FAILU	RES PER 106 WAS	╀┼┼┼┼┼┼┼	NOT REPR	RODUCIBLE	MTBF w = 431,034	MAS
	├┤ ┤ ┤┤┤┤┤					1.11.5

GROUP 2:	GROUP LEVEL FAILURE - RATE ANALY	YSIS
STABILIZATION PNEUMATICS F CONTROL λ=1946	THERMAL COMMUNICATION CONTRACTOR CONTRACTOR COMMUNICATION COMM	POWER ON-AYIS SEC OFFSET SUBSYSTEMS EXPERIMENT TRACKER \$\frac{1}{\lambda} = 29822 \text{\$\lambda} = 57 \text{\$\lambda} = 0.64
		# A ALPERATE SO G 9 P. 64 MTBF ALPERATE 19 485
STABILIZATION PNEUMATICS - - - - - - - - - - - - -	THERMAL COMMUNICATION & PATA HANDLING 2= 7.725	POWER ON-AXIS SEC OFFISET SUBSYSTEMS EXPERIMENT TWACHER \$\frac{1}{2} = \frac{1}{2} =
		1785 eno + 10,067 4785
STABILIZATION PNEUMATICS E CONTROL 2 = 25 3/4 2 = 77, 233	THERMAL COMMUNICATION E DISTA NUMBLING 3= 30,840	POWER ON-AXIS SEC OFFSET SUBSYSTEMS EXPERIMENT TRACKER
76: ML XARE IN FAULRES PER 106 HRS	7= / 7= 30,840	$\lambda = 4.325$ $\lambda = 57/$ $\lambda = 136 \text{ N} = 2$ $178 \text{ Fig. 7} = 73.28$

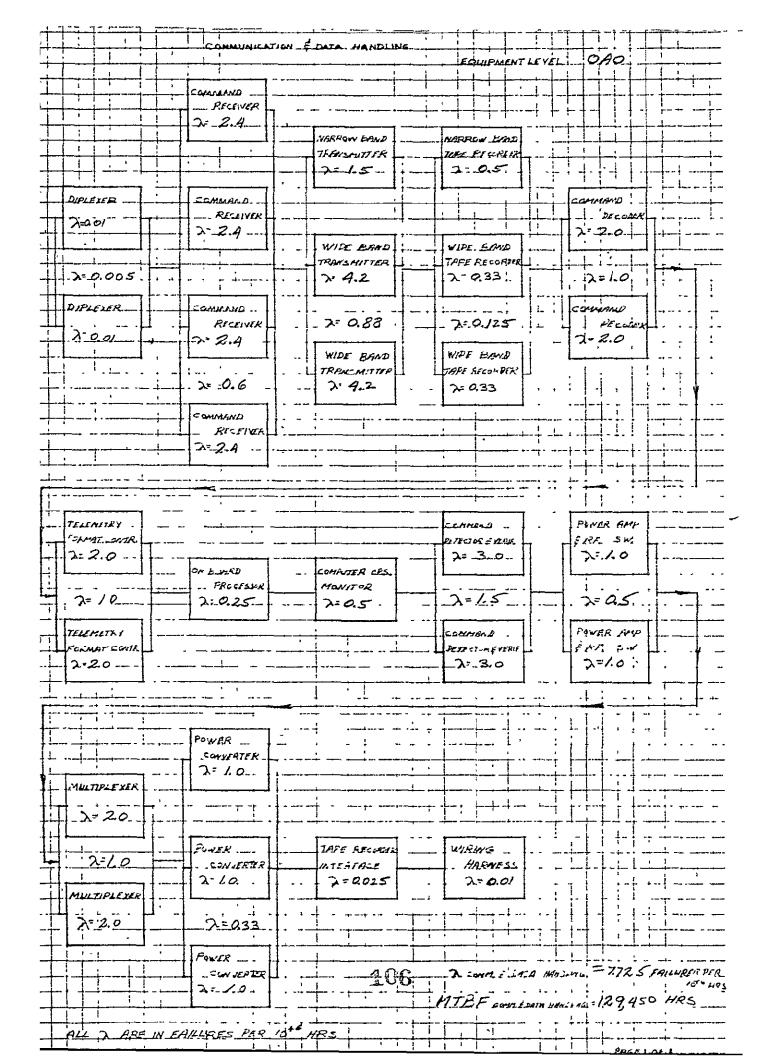
	GROUP LEVEL FAILURE	┆╶╎╶┆╸╎╸╎╸ ┤╼┤╼┤╼┼╼┼╾┼		
AIRGRAET RADIAL EXPERIMENT #		PADIAL EXPERIMENT NI 2. 114.15	RADIAL EXPERIMENTAL 2=1/4/5	/
SPACECRAFT RADIAL MECHANISMS EXPERIMENT A 2= 0.25	SPACECRAFT MECHANISMS 2025	RADIAL EXPERIMENT #2 \[\lambda = 1/4./5 \]	SPACECRAFT RADIAL MECHANISMS EXPERIMENT #2 2=0.25 7=1/4/5	2
RADIAL EXPERIMENT 2= 1/4 15		RADIAL EXPERIMENT H3 2= 1/4.15	RADIAL EXPERIMENTA = 114.25	63
MIBE AIRCRAFT = 37.56		26, 624 HRS	MTBF 17 = 26,624 HFS	
NOTE: PLL 2 ARE IN PAILURES PER	2 /06 //RS			7 (2 styles)

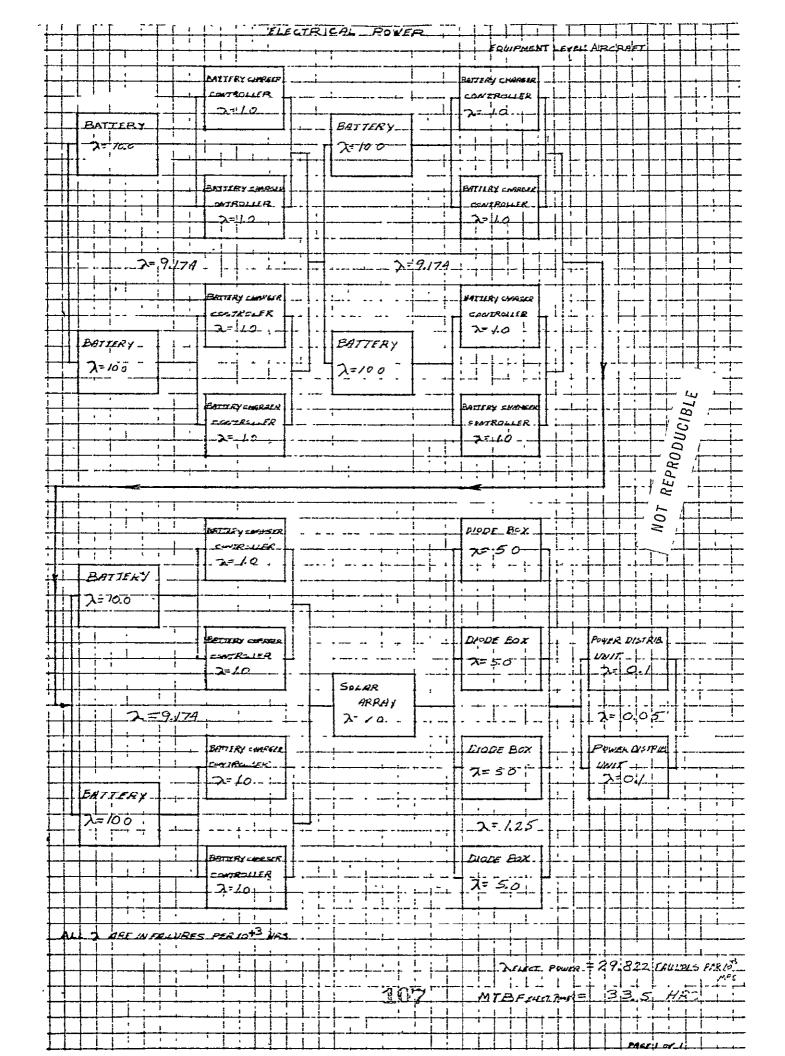
	UMATICS!	FOUNDAME OVEL BIRGRAFT
		FOUNTAIN AVEL HINGEHALT
GAS MAKS	YALVES	GRS JETS SHENDIPUNE
2-0.74	(SHUT OFF) -	TE ON FRANK COND.
	1 2 - 9.4 - 1 + + +	11-1-1-1-1-7-1-43-1
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GAS TANKS		
GAS TANKS	VALVES	GAS JETS SOLENOD VALVE
1 2 914 1 3 101	(SHUT OFF)	The street court
1 2 0/	1-2-0-4	1
		┧┖╌╶┋┈ ┪┩┈╏╌╬┺╊╬═╬═╬╣╏┪╌╏╌┪╌
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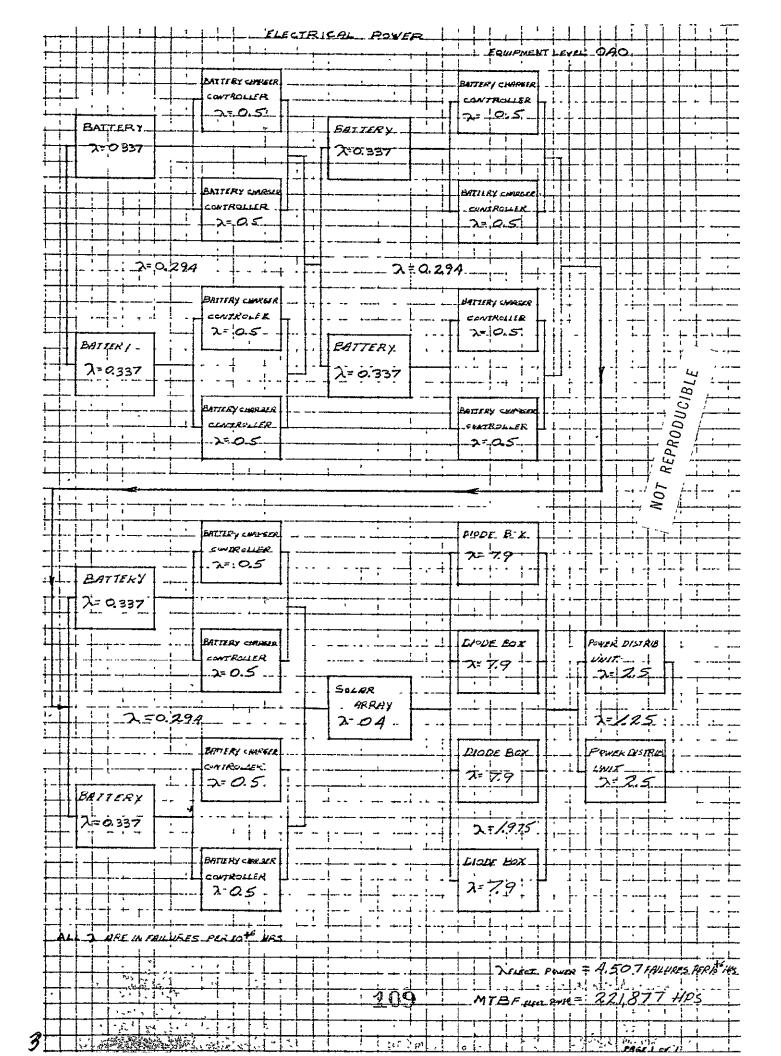
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TELEMETRY	COMMEND POWER GMP
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FORMAT CONTR.	
SPRATICONE. 3-5.0 ON BONED FROSTSYR MONITOR	2= 50 \\ \times 1.01
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FORMET CONTR. 2-50 ON BOARD EROSESUR MODITOR TELEMETRY FORMAT CONTR 2-50 POWER SOUVERTER TAPE RE MULTIPLENER POWER SOUVERTER TAPE RE MULTIPLENER POWER SOUVERTER TAPE RE MULTIPLENER POWER SOUVERTER TAPE RE TO 2-0.	CPS. $\lambda = 2.5$ $\lambda = 0.5$ CAMPINE PRINT FIRST $\lambda = 5.0$ $\lambda = 1.0$ $\lambda = 1.0$ WIRMS MARNESS $\lambda = 2.5$ $\lambda = 0.5$ PART SUP $\lambda = 1.0$
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TELEMETRY			FORMER POWER BAP.
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11-12-0-12-11-	Tauca de la constantia de		2.1.25
2-0.12	ON EDVAD	COMPUTER CPS	
	- PROSESSER	MONITOR	2=125
2= 0.12	}	1 '' '1	
2=.06	- PROSESSER	MONITOR	λ= 0.625 \\ \[\text{\sigma} = 0.85 \\ \text{\sigma} = 0.85
7= .06	- PROSESSER	MONITOR	2= 1.25 = 1.27 2= 0.625 = 2= 0.85 COMORNO FOWER SMP
7= .06 TELEMETRY FORMAT CONTR	PROCESUR .	MONITOR	2= 1.25 2=
7= .06	2: O.S.	- MONITOR - 2= 3.4	2= 1.25 = 1.27 2= 0.625 = 2= 0.85 COMORNO F9WER SMP
TELEMETRY FORMAT CONTR 2-0.12	2: 0.5%	- MONITOR	2= 1.25 2= 0.625 2= 0.625 2= 0.85 FOWER PAID DETECTION OF STRIFT 2= 1.25 2= 1.7
7= .06 TELEMETRY FORMAT CONTR	2: O.S.	- MONITOR - 2= 3.4	2= 1.25 2=
TELEMETRY FORMAT CONTR 2 - 0.12	2: 0.5%	- MONITOR	2=1.25 = 1.25 2=0.625 = 0.85 COMERAD FORES AND FORES A
TELEMETRY FORMAT CONTR 2 - 0.12	2: 05%	- MONITOR	2=1.25
TELEMETRY FORMAT CONTR 2 - 0.12	POWER	- MONITOR	2= 1.25 2= 0.625 2= 0.85 COMERAND F9WER AMP A=1.25 2= 1.25 2= 1.25 2= 1.25
TELEMETRY FORMAT CONTR 2 - 0.12	POWER CONVERTER	- MONITOR	2=1.25
TELEMETRY FORMAT CONTR 2-0.12	POWER	- MONITOR	2=1.25 2=0.625 2=0.85 COMERND FOURER AMP AT 1.25 2=1.7
TELEMETRY FORMAT CONTR 2 - 0.12	POWER CONVERTER	- MONITOR	2= 1.25 2= 0.625 2= 0.85 COMERAND F9WER AMP A=1.25 2= 1.25 2= 1.25 2= 1.25
TELEMETRY FORMAT CONTR 2. O. 12 MUTIPLE XER	POWER CONVERTER	- MONITOR	2=1.25 2=0.625 2=0.85 COMERND FOURER AMP AT 1.25 2=1.7
TELEMETRY FORMAT CONTR 2. O. 12	POWER CONVERTER	- MONITOR	2=1.25 2=0.625 2=10.85 COMMAND FOURE AND 2=1.25 2=1.7
TELEMETRY FORMAT CONTR 2. O. 12 MUTIPLE XER	POWER CONVERTER	- MONITOR	2=1.25 2=0.625 2=0.625 2=0.85 FAMER AMP DETECTION FORM 2=1.25 2=1.7
TELEMETRY FOLMAT CONTR 2-0.12 MULTIPLEXER \[\lambda = 10 \]	POWER CONVERTER	- MONITOR	2= 1.25 2= 0.625 COMERAND F9WER AMP A= 1.25 Σ= 1.7 Σ=
TELEMETRY FOLMAT CONTR 2-0.12 MULTIPLEXER \[\lambda = 10 \]	POWER CONTER POWER CONTERTER 7=1.3	TAPE RECEDE	2=1.25 2=0.625 COMERAND FOURTH STATE OF THE STATE OF T
TELEMETRY FORMAT CONTR 2 · O.12 MULTIPLEXER	POWER CONVERTER PLANER CONVERTER CONVERTER CONVERTER CONVERTER	TAPE RECIENT	2=1.25 2=0.625 2=0.625 2=0.85 F9WER PMP 2=1.25 2=1.7 2=1.7 WIKING MARNESS
TELEMETRY FORMAT CONTR 2. O. 12. MULTIPLE XER A=10	POWER CONTER POWER CONTERTER 7=1.3	TAPE RECEDE	2=1.25 2=0.625 COMERAND FOURTH STATE OF THE STATE OF T
TELEMETRY FORMAT CONTR 2-0.12 MULTIPLEXER MULTIPLEXER	POWER CONVERTER THE CONVERTER 2-13 POWER CONVERTER 2-13	TAPE RECIENT	2=1.25 2=0.625 2=0.625 2=0.85 F9WER PMP 2=1.25 2=1.7 2=1.7 WIKING MARNESS
TELEMETRY FORMAT CONTR 2. O. 12 MULTIPLE XER MULTIPLE XER	POWER CONVERTER THE CONVERTER 2-13 POWER CONVERTER 2-13	TAPE RECIENT	2=1.25 2=0.625 2=0.625 2=0.85 F9WER PMP 2=1.25 2=1.7 2=1.7 WIKING MARNESS
TELEMETRY FORMAT CONTR 2-0.12 MULTIPLEXER MULTIPLEXER	POWER CONVERTER 2-13 PLANER CONVERTER 2-13	TAPE RECIENTS TAPE R	2=1.25 2=0.625 2=0.625 2=0.85 F9WER PMP 2=1.25 2=1.7 2=1.7 WIKING MARNESS
TELEMETRY FORMAT CONTR 2-0.12 MULTIPLEXER A=1.0 MULTIPLEXER Z=1.0	POWER CONVERTER 2=1.3 PLANER 2-1.3 2=0.433	TAPE RECEDENT	2=1.25 2=0.625 2=0.625 2=0.85 FAMP DETECT SEVERIL 2=1.7 WIKING MARNESS 2=0.1
TELEMETRY FORMAT CONTR 2. O. 12 MULTIPLE XER MULTIPLE XER	POWER CONVERTER - 2= 1.3 POWER CONVERTER - 2= 1.3 POWER 2- 1.3 POWER R 2- 1.3	TAPE RECIENTS TAPE R	2=1.25 2=0.625 2=0.625 2=0.85 FAMP DETECTION OF WEAR PAID 2=1.25 2=1.7 WIFMS MARNESS 2=0.7
TELEMETRY FORMAT CONTR 2-0.12 MULTIPLEXER A=1.0 MULTIPLEXER	POWER CONVERTER 2-13 POWER CONVERTER 2-13 POWER CONVERTER 2-13 POWER CONVERTER	TAPE RECRESSED WITERINGE 2:0.56	2=1.25 2=0.625 2=0.625 2=0.85 FAMP DETECT SEVERIL 2=1.7 WIKING MARNESS 2=0.1
TELEMETRY FORMAT CONTR 2. O. 12. MULTIPLE XER A=10 MULTIPLE XCR	POWER CONVERTER - 2= 1.3 POWER CONVERTER - 2= 1.3 POWER 2- 1.3 POWER R 2- 1.3	TAPE RECEDENT	TEACH E SAID MADENIE = 30.840 FR. SEG SEG OFFICE
TELEMETRY FORMAT CONTR 2-0.12 MULTIPLEXER A=1.0 MULTIPLEXER	POWER CONVERTER 2-13 POWER CONVERTER 2-13 POWER CONVERTER 2-13 POWER CONVERTER	TAPE RECLESTS MITERIALE 2:0.56	2=1.25 2=0.625 2=0.625 2=0.85 FAMP DETECTION OF WEAR PAID 2=1.25 2=1.7 WIFMS MARNESS 2=0.7
TELEMETRY FORMAT CONTR 2. O. 12 MULTIPLE XER A=10 MULTIPLE XER Z=1,0	POWER CONVERTER 2-1/3 POWER CONVERTER 2-1/3 POWER CONVERTER 7-1/3	TAPE RECRESSED TO SECONDARY	TEACH E SAID MADENIE = 30.840 FR. SEG SEG OFFICE
TELEMETRY FORMAT CONTR 2. O. 12 MULTIPLE XER A=10 MULTIPLE XER Z=1,0	POWER CONVERTER 2-1/3 POWER CONVERTER 2-1/3 POWER CONVERTER 7-1/3	TAPE RECRESSED TO SECONDARY	TEACH E SAID MADENIE = 30.840 FR. SEG SEG OFFICE





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	PATTERY CHREEK	BETTERY CHEESER
	CONTROLLER !!!	CONTROLLER
	210	7-10-11
BATTERY	BATTERY.	
7=1.4	7-14	
		
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	CONTROLLER	CUNTROWER
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	BETTERY CHORACE :	BATTERY SHAPE OF
	CONTROLLER	
		
		
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	7=10:	
BATTERY		
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	Z= 10	2-1/5-1/5-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1
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λ=0.95	Z= / O SOLER.	7-14-14-14-14-14-14-14-14-14-14-14-14-14-
λ=0.95	SOLER ARRAY 2= D.A.	7 0,75
λ = 0.95	SOLDR. ARRAY DETTERY CHARGER	7-14-14-14-14-14-14-14-14-14-14-14-14-14-
λ = 0.95	ENTERY CHARGER	FEMER WSTRUS
	ENTIERY CHARGEE CHAIRCLER TENTERY CHARGEE CHAIRCLER TENTERY CHARGEE	FIODE BOX PEWER LYSTRIA T= 1.3 T= 1.5
2=0.95 BAZTERY	EMPLEY CHARGE CHARGE TELO	LIADE BOY PEWER OFFICE WIT 7= 1.3 7= 1.5 WIT 7= 1.5
	ENTIERY CHARGEE CHAIRCLER TENTERY CHARGEE CHAIRCLER TENTERY CHARGEE	
	EMPLEY CHARGE CHARGE TELO	LIADE BOY PEWER OFFICE WIT 7= 1.3 7= 1.5 WIT 7= 1.5
	EMPLEY CHARGES CONTROLLER ARRAY A= D.A BATTERY CHARGES CONTROLLER A= 10	2= 1.5 2= 0.75 EIODE BOY PEWER USTRIA 12= 1.3 2= 1.5 12= 1.5 12= 1.5
	EATTERY CHARGER BATTERY CHARGER BATTERY CHARGER BATTERY CHARGER	
BAZTERY	ENTERY CHARGER CONTROLLER BRITERY CHARGER CONTROLLER CONTROLLER CONTROLLER	DIODE BOY PEWER DISTRICE A= 1/3 A= 1/3 A= 1/5 LIONE BOX LIONE BOX
BAZTERY	EATTERY CHARGER BATTERY CHARGER BATTERY CHARGER BATTERY CHARGER	2= 1.5 2= 0.75 EIODE BOY PEWER USTRIA 12= 1.3 2= 1.5 12= 1.5 12= 1.5
BAZTERY	ENTERY CHARGER CONTROLLER BRITERY CHARGER CONTROLLER CONTROLLER CONTROLLER	DIODE BOY PEWER DISTRICE A= 1/3 A= 1/3 A= 1/5 LIONE BOX LIONE BOX
BAZTERY	BATTERY CHARGER CONTROLLER ARRAY ARRAY ARRAY BATTERY CHARGER CONTROLLER ALLO BATTERY CHARGER CONTROLLER ALLO	DIODE BOY PEWER DISTRICE A= 1/3 A= 1/3 A= 1/5 LIONE BOX LIONE BOX
BAZTERY	ENTERY CHARGER CONTROLLER BRITERY CHARGER CONTROLLER CONTROLLER CONTROLLER	DIODE BOY PEWER DISTRICE A= 1/3 A= 1/3 A= 1/5 LIONE BOX LIONE BOX
BAZTERY	BATTERY CHARGER CONTROLLER ARRAY ARRAY ARRAY BATTERY CHARGER CONTROLLER ALLO BATTERY CHARGER CONTROLLER ALLO	
BAZTERY	ENTIFY CHARGER CONTROLLER DATERY CHARGER DATERY	DIODE BOY PEWER DISTRICE A= 1/3 A= 1/3 A= 1/5 LIONE BOX LIONE BOX
BAZTERY	EATTERY CHARGES BATTERY CHARGES CHATROLLER TO SOLDR. ARRAY ARRAY TO SOLD	TIODE BOX PEWER IVSTRIA T= 1.3 T= 2.3 T= 1.5 LIONE BOX T= 1.3 T=
BAZTERY	ENTIFY CHARGER CONTROLLER DATERY CHARGER DATERY	TIODE BOX PEWER IVSTRIA T= 1.3 T= 2.3 T= 1.5 LIONE BOX T= 1.3 T=
BAZTERY	EATTERY CHARGES BATTERY CHARGES CHATROLLER TO SOLDR. ARRAY ARRAY TO SOLD	TIODE BOX PEWER IVSTRIA T= 1.3 T= 2.3 T= 1.5 LIONE BOX T= 1.3 T=
BATTERY	ENTERY CHARGER CUNTROLLER Z= 10 SOLDR ARRAY Z= 0.A BATTERY CHARGER CUNTROLLER Z= 1.0 SPER 10 46 WES	TIODE BOX PEWER IVSTRIA T= 1.3 T= 2.3 T= 1.5 LIONE BOX T= 1.3 T=



Appendix Section 4

Cost Model/Analysis Computer Outputs

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	PROGRAM	NG. 1		
ورجا والمارات المقارب المناورة والمرابعة والمرابعة والمرابعة والمرابعة والمرابعة والمرابعة والمرابعة والمرابعة				<u> </u>
HUTTLE SCHEDULE DELAY 0.5				
STAL SYSTEM MITE 3.0				
AP, SUBSYSTEM SLOPE, 1.25		and the state of t	ندو المارية الماري	
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		• • • • • • • • • • • • • • • • • • •	***********	
SHUTTLE-MAINTAINED PROGRAM				
(3 SPACECRAFT)-NOT OPTIMIZED			OPERATIONS	
1STRUCTURE	2015000		**********	
2 ENGINEERING	20150000. 17500000.	2250126*		
				Y
4 THEPMAL	2120000.	2910971•		
5 S-C MCCHANISMS		2721481		
6 ELECTRIC POWER	28892.	729178		
7 * POIMARY OPTICS	3300000.	8000878		- ^
B COMM. & DATA HANDLING	167969.	1089390	10 · · · · · · · · · · · · · · · · · · ·	
9 PHEUMATICS		235628.		
TEST & SUPPORT FOU IPMENT	4669540.	2070634.		
IIPROGRAM MANAGEMENT	25 13000.	7112000.		•
12 SYSTEM INTEGRATION	944000,	2448698.		
13RELIABILITY	111600	13800		
14 QUALITY ACCEPTANCE	1445220.	5820000.		
15TITAN INTERSTAGE	592000	670000.		
16 * TITAN SHROUD	0.40	1000000.		
17 SHUTTLE INTERFACES		199/000.		
TRAINERS & SIMULATORS	3110400.	100000.		
9 * FXPERIMENTS A C B		39000000.		·
PO GROUND STATION	3251000.	800000.		
SI_ * NEW COMPUTERS	4550000			
A A UNICH GOOD A TRONG				
LAUNCH OPERATIONS	0.0	22500000.		
23 * LV-SHUTTLE	0.0			
S-C SUPPORT	. 0.0	4950000		
S_ *FACILITIES	1347012.	· · · · · · · · · · · · · · · · · · ·		
* SHUTTLE UPDATE FLIGHT	0.0	15000000.		
7 * EXPERIMENT UPDATE	0.0			
4 * G.S.F.C. & OTHER	0.0	60000000.		
O OPPLITAL OPERATIONS	······································	· · · · · · · · · · · · · · · · · · ·	9000000.	
G & A CHARGEARLE	B11.0653A	, 48713464	400000	•
G & A	81105520+ 10462607+	68312656 8812329.	1160999.	
SUBTOTAL	91568112.	77124976.	£ 1 1 1 2 2 3 3 6	
NON-G & A SURTOTAL	14197012.	194863690.		
TOTAL	105765120.	271988480.	10160999•	
*NO G & A CHARGE				
 		TOTAL	387914496.	
COST OF ADD'L SHUTTLE REPATR FL		14 T	210000000.	
GRAND TOTAL			597914368	
NO. OF FAILURES 48.00				·

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the property of the state of th PERCOM PROGRAM PROGRAM NO. 2 error or hill that etc. SHUTTLE SCHEDULE DELAY... 1.0 TOTAL SYSTEM MITF..... 3.0 VAR. SUBSYSTEM SLOPE.... 1.25 SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED NON-RECURRING RECURRING OPERATIONS 30649216. 175000000. 2250126. ENGINEERING 2 3 STABILIZATION 60862. 1617140. THERMAL 2120000. 2910971. 3520000. 2721483. S S-C MECHANISMS 28892. 729170. ELECTRIC POWER 33000000 8000B7H. * PRIMARY OPTICS 167869. 1089890. COHM. & DATA HANDLING 1214. 235628. PHEUHATICS TEST & SUPPORT FQUIPMENT 4669540. 2070634. 10 11 ____PROGRAH MANAGEMENT 7119000. 2533000. NOT REPRODUCIBLE SYSTEM INTEGRATION 944990. 2449499. 1 1 1800 . 111600. RELIABILITY QUALITY ACCEPTANCE 1445220. 5820000. 15___TITAN INTERSTAGE 670000-582000. 16 * TITAN SHROUD 0.0 10000000 17___SHUTTLE INTERFACES 209100000. 1997000. IN TRAINERS & SIMULATORS 3110400. 1000000. 50000000. 390000000. 19 * EXPERIMENTS A & B POTTATE CHUCHA TATION 800000. 3251000. 4550000. 21 * NEW COMPUTERS LAUNCH OPERATIONS
22 * LV-TITAN 0.0 225000000 LV-SHUT TLF 0.0 100000000 49500000 S-C SUPPORT 0.0 362826. FACILITIES 1347012. 26 * SHUTTLE UPDATE FLIGHT 150000000 0.0 390000000. 27 * EXPERIMENT UPDATE 0.0 600000000 28 * G.S.F.C. & DTHER 0.0 DRRITAL OPERATIONS 9000000. G & A CHARGEABLE 81105520. 68312656. 8812329* 1160999. GEA 10462607. 91568112. 77124976. SUBTOTAL NON-G C A SUBTOTAL 14197012. 194863680. 10160999. 105765120. 271988480. TOTAL *NO G & A CHAPGE 387914496. TOTAL COST OF ADDIL SHUTTLE REPAIR FLTS 180000000. 567914496. GRAND TOTAL NO. OF FAILURES 42.00 UPTIME (YEARS).... 10.50 UPTIME RATIO 0.70

PERCOM PROGRAM PROGRAM NO. 4 SHUTTLE SCHEDULE DELAY. 2.0 TOTAL SYSTEM MTTF..... 3.0 VAP. SUBSYSTEM SLOPE. ... 1.25 SHUTTLE-MAINTAINED PROGRAM RECURRING ____OPERATIONS____ (3 SPACECRAFT)-NOT OPTIMIZED _____NON-RECURRING 30649216. 175000000 2250126. . ? ENGINEERING 3 __ STABILIZATION 60862. 1617140. 2120000. 2910971. THERMAL S S-C MECHANISMS 3520000. 2721497. 28892. 729178. 6 ELECTRIC POWER 3300000. 8000878. 7 * PRIMARY OPTICS 1089890. 5 COMM. & DATA HANDLING 167869. 9 PHEUMATICS 1214. 2 15628. 2070634. 4669540. TEST & SUPPORT FOUIPMENT 11 PROGRAM MANAGEMENT 2533000. 7119000. 2448698. 944000. 12 SYSTEM INTEGRATION 13 RELIABILITY 111600. 133800. 14 QUALITY ACCEPTANCE 1445220. 670000. 15 TIYAN INTERSTACE 582000. 1000000. 0.0 16 * TITAN SHROUD 17 __ SHUTTLE INTERFACES_-20910000. 100000 14 TRAINERS & SIMULATORS 3110400. 19 * EXPERIMENTS A C B 5000000. 390000000 800000. 3251000. 20 GROUND STATEON 21 * NEW COMPUTERS 4550000. _LAUNCH OPERATIONS_ __ _ ____ 225000000. 0.0 0.0 LV-SHUTTLE 10000000. 49500000. 0.0 S-C SUPPORT 24 25_ * FACILITIES 1347012. 352825· 0.0 150000000-26 * SHUTTLE UPDATE FLIGHT ___ 0.0 39000000. 27 * EXPERIMENT UPDATE 0.0 600000000. PR * G.S.F.C. & OTHER 2000000 ORBITAL OPERATIONS 68312656. _______1160999. 81105520. G & A CHARGEABLE 10462607. G & A SURTOTAL ___ 91568112. 77124976. 194863690. 14197012. NON-G & A SUBTOTAL 105765120. 271988440. 10160999. TOTAL *NO G & A CHARGE TOTAL 387914496. COST OF ADDIL SHUTTLE REPAIR FLTS 137999952 525914368. GRAND TOTAL 33.60 NO. OF FAILURES. ... UPTIME (YCARS).... 8.40 UPTIME RATIO..... 0.56

	PROGRAM N	D • 5		والمالية والمالية المالية والمالية والمالية والمالية والمالية والمالية والمالية والمالية والمالية والمالية
The second section is the second section in the second section in the second section s	· · · · · · · · · · · · · · · · · · ·		•	
SHUTTLE SCHEDULE DELAY 2.5		Mr. A.	ساليات الله الله الله الله الله الله الله ال	
TOTAL SYSTEM MITE 3.0			•	•
VAR+_SUBSYSTEM_SUPPE+++1+25			the property of the party of the later of the party of th	
) 	
SHUTTES-MAINTAINED PROGRAM	••••			
SHUTTES-MAINTAINED PROGRAM (3 SPACECPACT)-NOT OPTIMIZED	NON-RECURRING .	RECUMBING	OPERATIONS	
			•••••	
1 STRUCTURE	20150000+			*
2 ENGINHERING	17500000.	2250126. 1617140.		
3 STABILIZATION	60862	2910971*		
4 THERMAL	2120000. 3520000.	2721483.		
5 S-C MECHANISMS	28992.	729178.		* .
A ELECTRIC POWER	3300000.	8000978.		
7 * PRIMARY PRICES 8 COMM. 6 DATA HANDLING	167969.	1089890.	/	
	1214.	235628.		
9 PHEUMATICS 10 TEST 6 SUPPORT FOULPMENT	4669540.	2070634.	'. "O _r	
11 PROGRAM MANAGEMENT	2533000	7119000	- Pr	
12 SYSTEM INTEGRATION	944000.	2449599.	REPRODUC	•
13RFLIABILITY	111600	133900		
14 QUALITY ACCEPTANCE	1445220.	5820000. 570000. <u>:</u>	· · · · · · · · · · · · · · · · · · ·	′o
. 15 TITAN INTERSTAGE	582000	1000000		01×
16 * TITAN SHPOUD	0.0 20910000.	1997000.		
17 SHUTTLE INTERFACES	3110400•	100000•		
18 TRAINERS & SIMULATORS	5000000.	39000000		
19 * EXPERIMENTS A 6_B 20 GROUND STATION	3251000.	800000		
21 * NEW COMPUTERS	4550000.	0.0		
		•		
LAUNCH OPERATIONS				
22 * LV-T[TAN	0.0	22500000·		
23 * LV-SHUTTLC	0.0	10000000		
24 S-C SUPPORT	0.0 1347012.	362826•		
25 * FACILITIES	1347012+	15000000		
26 * SHUTTLE UPDATE FLIGHT	0.0	390000000		
27 * EXPERIMENT UPDATE 28 * G.S.F.C. & OTHER	0.0	60000000	•	
PO # 0434F4C4 & CINGS	·			
29 DRUITAL DOFRATIONS		•	9000000•	•
G & A CHARGEABLE	81105520	68312656.	1160999•	
G & A	10462607.	8812329*	1100334	
SUBTOTAL	91568112+	77124976. 194863680.		
NON-G & A SUBTOTAL	14197012.	271989480.	10160999•	
TOTAL	105765120.	C(1,400,40A)		
NO G & A CHARGE		TOTAL	387914496.	
COST OF ADD'L SHUTTLE REPAIR FL		The second second	122727200.	
	T		510641664.	
GRAND TOTAL NO. OF FAILURES 30.55				
UPTIME (YEARS) 7.64				
UPTIME RATIO 0.51				

	PERCON PRO	GRAM		
	PROGRAM N	D. 6		

		- many		
TOTAL SYSTEM MITE 3.0				
VAR. SUBSYSTEM SLOPE 1.25				
SHUTTLE-MAINTAINED PROGRAM		OSCHOOT NG	OPERATIONS	
(3 SPACECRAFT)-NOT DPTIMIZED	NON-RECURRING	RECURRING		
	20150000	30649216		
1 STRUCTURE	17500000.	22501264		
2 ENGINEERING 3 STABILIZATION	60862+	1617140.		
A THERMAL	. 2120000.	2910971.	•	•
5 S-C MECHANISMS	35200004			
A ELECTRIC POWER	28892.	720178.		
7 * PRIMARY OPTICS	3300000.	8000478. 1082890.		
A COMM. & DATA HANDLING	167869.	235624		
9 PARTUMATICS	1214.	2070614.	*	
10 TEST & SUPPLIED EQUIPMENT	2533000.	7119000	4	
PPDGRAM MANAGEMENT	944000•	2448698.	•	
1S SARIEM THILL PHYSICAL	111600.	133900.		
13 RELIABILITY	1445220.	5820000.		
14 QUALITY ACCEPTANCE	582000.	670000.		•
15 TITAN INTERSTAGE	0.0	1000000.		
16 * TITAN SHROUD 17 SHUTTLE INTERFACES	20910000.	1997000.		
THE TAX TO SEE THE SECOND SECO	3110400.	100000.		
19 * EXPERIMENTS A & B	5000000	39000000.		
20 GROUND STATION	3251000.	8000000		
21 * NEW COMPUTERS	4550000			
LAUNCH OPERATIONS	0.0	22500000•		
22 * LV-TITAN	0.0	10000000.		
23 * LV-SHUTTLE	0.0	49500004	•	,
24 S-C SUPPORT	1347012.	362826.		
25 * FACILITIES 26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.		
27 * EXPERIMENT UPDATE	0.0	39000000		
28 * G.S.F.C. & OTHER	- 0.0	60000000	•	
CO T GENERAL A VILLEN			9000000	
29 ORBITAL OPERATIONS			4000000	
G & A CHARGEABLE	A1105520.	68312656	1160999•	
G & A	10462607.	4912329• 77124976•	• • • • • • • •	
SUBTOTAL	91568112+	194863680.		
NON-G & A SUBTOTAL	14197012.	271998480*	10160999•	
TOTAL	1031031703			
NO G & A CHARGE	,	TOTAL,	397914496.	
COST OF ADDIL SHUTTLE REPAIR FL			110000000	
	•		497914368.	
GRAND TOTAL NO. OF FAILURES 28.00		,,,	•	

PERCOM PROGRAM

	20000111	_ (and the state of t	
	PROGRAM	NU 0 /		1
THE REAL PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS OF THE P		, and a second second to a manufacture designation	and the second s	
SHUTTER SCHEDULE DELAY. 6.0				
TOTAL SYSTEM MITCHARAR 3.0				
yan, ենրուներտ են մահետ («Քմ <u></u>	x		, storn, n == 4000	C AND THE PROPERTY AND
		•	•	·

SHUTTLE-MAINTAINED PROGRAM				
(3 SPACECRAFT) - NOT OPTIMIZED	NON-RECURRING _	RECURRENG	OPERATIONS	
	*************	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	*********	
1 STRUCTURE	17500000	2250126		
2 FNGINTFPING				
3 STATILIZATION	60862.	2010071		
	3520000.			
5 S-C MECHANISMS 6 ELECTRIC POWER	20392	729178		
7 * PRIMARY OPTICS	3300000.	8000878.		
B COMM. & DATA HANDLING	167869.	1089890		
9 PHEUMATICS		235628.		•
10 TEST & SUPPORT FOUTPMENT	4669540	20/0634.		
II PROGRAM MANAGEMENT		7119000.		
12 SYSTEM INTEGRATION	944000.	2449698.	NOT -	
13 RELIABILITY		137900.	NOT REPRO	7000
14 QUALITY ACCEPTANCE	1445220.	5820000.		DOCIBLE
15 TITAN INTERSTAGE	5A2000.	670000.		
16 * TITAN SHROUD	0.0	1000000.		
17 SHUTTLE INTERFACES	20910000.	1997000.		
IN TPAINERS & SIMULATORS	3110400.	t 00000.		
10 # EXPERIMENTS A & R	5000000.	39000000		
20 GROUND STATION	3251000.	800000.		•
21 * NEW COMPUTERS	4550000 •	0.0		
LAUNCH BOFPATIONS	0.0	22500000.		
22 * LV-TITAN		10000000		
23 * LV-SHUTTLE	0.0	4950000.		
	1347012.			
26 * SHUTTLE UPDATE FLIGHT	0.0			
27 * EXPERIMENT UPDATE	0.0	39000000		
28 * G.S.F.C. & OTHER	0.0	60000000.		,
	· · · · · · · · · · · · · · · · · · ·		9000000	<u> </u>
29 ORBITAL OPERATIONS			9000000	
G & A CHARGEABLE	81105520.	68312656. 8812329.		
G & A				
LATOTEUS	91568117	77124976.		
NON-G & A SUBTOTAL	14197012.	194863680.	10160999•	
*NO G & A CHAPGE	105765120	271988480.	1.01.003334	
*NO G & A CHAPGE	•	TOTAL	387914496.	
COST OF ADDIL SHUTTLE REPAIR FLTS		TOTAL,	63333280.	
		•	451247616.	
NO. OF FAILURES 18.67		سوستدن د دروس د سد. ۱. و	a production of the control of the c	
NO. OF FAILURES 18.67 UPTIME (YEARS) 4.67		• •		
OLLE ME FALSH ASSESSED ASSESSED				

	PROGRAM ?	MO . O		
•	PRIIGRAM	NU # D		
. The set	*			
SHUTTLE SCHEDULE DELAY. 12.0			والمتعادة والمتعادة فيهمونها فوجول الدائمة المتعادة والمتعادة المتعادة المتعادة المتعادة المتعادة	
TOTAL SYSTEM MITE 3.0	•		•	
VAR. SURSYSTEM SLOPE 1.25		and the same of th		
•				
***************************************	• • • • • • • • • • • • • • • • • • • •		The second secon	
SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED	NON-DECURRING	RECURRING	OPERATIONS	
(3 SPACECRAFT) = NUI UPITMIZED			*******	
1 STRUCTUPF	20150000	10649216.	The state of the s	*
2 ENGINEEDING	17500000.	2250126.		•
3 STABLEIZATION	60862.	1617140+	and the second s	
4 THERMAL	60862.	2910971.		
5 S-C MECHANISMS	3570000	2721483.		
6 ELECTRIC POWER	28892.	729178.		
7 * PRIMARY OFFICS	3300000.	.3000878+ 1089890+		
A COMM. & DATA HANDLING	167869.	245628.		
9 PHEUMATICS		2070634		
TOST & SUPPORT EQUIPMENT	4669540.			
11 PROGRAM MANAGEMENT	2533000 244000 •	2449695		•
12 SYSTEM INTEGRATION	111600•			
13 PELIAGILITY	1445220.	5820000.		
14 QUALITY ACCEPTANCE	582000	670000.		
15 TITAN INTERSTAGE	0.0	1000000.		
16 # TITAN SHPOUD	20910000.	1997000		
17 SHUTTLE INTERFACES 18 TRAINESS & SIMULATORS	3110400.	100000		
18 TRAINERS & SIMULATURS 19 # EXPERIMENTS A & B	5000000.	39000000		
20 GROUND STATION	3251000.	800000.		•
PI * NEW COMPUTERS	4550000.	0.0		

LAUNCH DEFRATIONS				
22 * LV-TITAN	0.0	22500000.		
23 * LV-SHUTTLE	0.0			
ZA. S-C SUPPORT	0.0	4950000• 362826•		
25 * FACILITIES	1347012	15000000	manufacture and the second state in the relation was detected to the second	
26 "* SHUTTLE UPDATE FLIGHT	0.0	39000000		
27 * EXPERIMENT UPDATE	0.0	60000000		
29 * G.S.F.C. & NTHER	0.0	4.0000.000		
The second secon			9000000	
29 ORBITAL OPERATIONS	81105520+	68312656.		
G & A CHARGEABLE	10462607.	8812329.	1160999•	
G & A	91568112.	77124976.		
NON-G & A SUBTOTAL	14197012.	194863680.	• • •	
TOTAL	105765120.	271988480	10160999•	
*NO G & A CHARGE			 -	
THAT A A COULDING		TOTAL	387914496.	
COST OF ADDIL SHUTTLE REPAIR F	LTS	-	25999984.	
GRAND TOTAL			413914368.	
NO. OF FAILURES 11.20	·			

PERCOM PROGRAM

	PROGRAM	NU 4 9		
SUBSTITUTE SCHEDULE DELAY OF A				. Mangamban ayan ini dan
SHUTTLE SCHEDULE DELAY 24.0				
VARSURSYSTEM_SLORE, 1,25				
				
* * * * * * * * * * * * * * * * * * * *			****	
SHUTTLE-MAINTAINED PROGRAM	•		7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	
(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
			******	_
1 STRUCTURE		30649216+		
	17500000.	2250176.		•
4 THERMAL	2120000	2910971.	we make a set for up of the set o	
6 FLECTRIC POWER	28892•		managed and property or the state of the sta	
7 * PRIMARY OPTICS	3300000.	8000378	•	
B COMM. E DATA HANDLING	167869.	1089890		
9 PNEUMATICS	1214.	235628• '		•
10 TEST & SUPPORT FOULPMENT	4669540	2070614.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
11 PROGRAM MANAGEMENT	2533000.		` -' b .	ODUCIBLE .
12 SYSTEM INTEGRATION	944000.	2448698	The state of the s	
13RELIABILITY	111600.	131800.	, A	
14 DUALITY ACCEPTANCE	1445220.	5920000.		000
15TITAN INTERSTAGE	582000.	670000.		6/p.
16 # TITAN SHROUD	0.0	1000000.		· · · · · · · · · · · · · · · · · · ·
17 SHUTTLE INTERFACES	20910000.	1997000.		
19 TRAINERS & SIMULATORS	3110400.	100000.		
19 * EXPERTMENTS A & B	5000000	39000000		
20 GROUND STATION	3251000.	90000 -		
21 * NEW COMPUTERS	4550000	0.0		
LAUNCH OPPRATIONS				
27 * LV-TITAN	0.0	22500000.		
27 * LV-SHUTTLE	0.0	10000000.		
24 S-C SUPPRRT	0.0	49500000		
25 * FACILITIES	1347012.	362826.		
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.	•	•
27 * EXPERIMENT UPDATE	0.0	39000000.		
28 * G.S.F.C. & OTHER	0.0	60000000.	•	
29 ORBITAL OPERATIONS			9000000	
G & A CHARGEABLE	81105520.	68312656		*, *
GEA	10462607.	8812329.	1160999.	
SUPTOTAL	91568112+			
NON-G & A SUSTOTAL	14197012.	194863680.		
TOTAL.	105765120.	271988480.	1 01 60 999.	
*NO G & A CHARGE				
	, 	TOTAL	387914496.	
COST OF ADDIL SHUTTLE REPAIR FLI	rs .		0.0	
GRAND TOTAL			3879[4496	
NO. OF FAILURES 6.22				
URTIME (YEARS) 1.56	المراجعين بالمناس ويوالي فيورون المراجع الأمياني الأكامة الريانية والمراجع المراجع المراجع المراجع المراجع			
UPTEME RATIO 0.10		* ,*		

هو المحاور والمحاورة والمح	PERCOM PR	GGRAM	•	4
	PROGRAM			b .
		the plant makes the second to be second, and the second and the se	ويوس بهندون بهندون به و به بدون و به بدون و به بدون و به بدون و بدون	
SHUTTLE SCHEDULE DELAY		and the second s	مرغد وتناويكم ويونكناهميو ويكافئن ويووي به يهمه شد وويهند او بني يجوب ويستخدر ويسته	
TOTAL SYSTEM MITTERS DOU				
VAR. SUBSYSTEM SLOOF 1.25				
************				•
SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
************	20150000	30649216.		
STRUCTURE	17500000	2250126•	·	ŕ
7 STABILIZATION		5614659.	The state of the s	
T STABILIZATION	2120000.	2910971.		
4 THERMAL 5 5-C MCCHANISMS	3520000.		white word with great from the party of the state of the	
FLECTRIC POWER	100717.	2531682		
7 * P214APY OPTICS	3700000.			
B COMM. 5 DATA HANDLING	582836	3784059		
O PHELIMATICS	4215	018092+ 2070634+		
TEST & SUPPORT FOUTPMENT	4669540.			
11 PROGRAM MANAGEMENT	2533000.	2448698 •		•
12 SYSTEM INTEGRATION	944000•			
13 RELIABILITY	111600	5920000.	1	
14 QUALITY ACCEPTANCE	582000	£ 70.000		
TITAN INTERSTAGE	382000	1000000	•	
16 * TITAN SHROUD	20910000	19970000	The state of the s	
17 SHUTTLE INTERFACES	3110400.	100000		
INVINERA PARENTENA	5000000	39000000 **		
19 * FXPERIMENTS A & A	3251000.	800000.		
20 GROUND STATION	4550000.	0.0		
21 * NEW COMPUTERS		· 		
LAUNCH OPERATIONS	0.0	225000004		
" 22 * LV-TITAN '	0.0	10000000.		
23 * LV-SHUTTLE	- 0.0	4950000.		
24 S-C SUPPORT	1347012.	362826.		***
25 * FACILITIES POSTE FLIGHT	0.0	15000000		
27 * FXPERIMENT UPDATE	0.0	39000000	the state of the s	
28 • G.S.F.C. G OTHER	0.0	60000000		
ZH + (1.361 - 0.00 - 0.			9000000	
29 DRAITAL OPERATIONS		77389312.		
G & A CHARGEABLE	81745376	9983217	1160999•	
3 -G & A	10545149	87372528		
SUSTOTAL	92290512• 	194863680.		
NON-G & A SUBTOTAL	105487520.	282236160+	10160999.	
TOTAL	[04487-320*			
*NO G & A CHARGE	•	TOTAL	39884352	
TOUR TOUR TOUR TOUR TOUR TOUR TOUR TOUR	TS		99230720.	
COST OF ADD'L SHUTTLE REPAIR FL	—		498115072.	
GRAND TOTAL		•		
NO. OF FAILURES 25.85 UPTIME (YCARS) 12.92				
UPTIME CYCARSTON 0.86		•		

معي من و من من من و من من و من و من و من و	PROGRAM	NO.11	
SHUTTLE SCHEDULF DELAY 1.0			والمستورة والمنتورين والمنتورين والمنتورة والم
TOTAL SYSTEM MITE 6.0 /ARSUBSYSTEM_SLOPE 1.25			•
\ \\ \``````````````\`````````````````			
			,
SHUTTLE-MAINTAINED PROGRAM	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		A S A A A A A A A A A A A A A A A A A A
	NON-RECURPTING	RFCURRING	OPERATIONS
			4700000000000000
1 STAUCTUAL	20150000	30649216.	
2 FNGINCERING	17500000.	2250126.	•
3 STABLITATION	211709.	5614659.	
4 THERMAL	2120000.	2910971.	
5 _ S-C MECHANISMS	3520000•	27/1483.	
6 SECCTREC POWER	100712.	2531692.	,
7 * PRIMARY OFFICS		8000078	
8 COMM. & DATA HANDLING	582836.	3784059.	
פ האבוואאדורא	4215.		
10 TEST & SUPPORT EQUIPMENT	4669540.	2070634.	
· · · · · · · · · · · · · · · · · · ·		7119000	
12 SYSTEM INTEGRATION	944000.	2449699,	/
		133800.	NOT REPRODUCIBLE
14 QUALITY ACCEPTANCE	1445220.	5920000.	/ Nor
15 TITAN INTERSTAGE			
16 * TITAN SHROUD	0.0	1000000.	PROA
17 SHUTTLE INTERFACES		1997000+	
18 TRAINERS & SIMULATORS	3110400.	100000.	< ''/β/ _Γ
19 * EXPERTHENTS A & B			
20 GROUND STATION	3251000. 4550000.	800000	
21 * NEW COMPUTERS	45700004		
LAUNCH OPERATIONS			
22 * LV-TITAN	0.0	22500000.	مراه المراه المراع المراه المراه المراه المراه المراه المراه المراه الم
23 * LV-SHUTTLE	0.0	10000000	•
24 S-C SUPPORT	0.0	4950000.	
	1347012.	362826.	
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.	
27 * EXPERIMENT UPDATE	0.0	39000000.	
28 * G.S.F.C. & OTHER	0.0	60000000	Andrew Andrew 1 mars 14 M by the second the second that the second
29 DRUITAL OPERATIONS			9000000
G & A CHARGEABLE	81745376.	771R9312	
GCA	10545149.	9983217.	1160999.
SURTOTAL	92290512.	87172529.	
NON-S & A SUBTOTAL	14197012.	19486 1080	
TOTAL	106487520.	282236160	10160999•
*NO G & A CHAPGE			
The second of th		_TOTAL	398984352.
COST OF ADDIL SHUTTLE REPAIR FLTS			90000000
NO. OF FAILURES 24.00			488884224.

PERCOM PROGRAM

PROGRAM NO.12					
The particular was provided by the control of the c				and the state of t	
SHUTTLE SCHEDULE DELAY 1.5					
TOTAL SYSTEM MITE 6.0	ar - 112				
VAR. SUBSYSTEM SLOPE 1.25					
ANK TOOLISIEW THE COLUMN TO SEE THE STREET	1974 که مغرور ۱۹۵۵ که در ۱۹۵۰ ویی سرخت اینا دخو رس الفاد سر		*		
SHUTTLE-MAINTAINED PROGRAM					
(3 SPACE CPAFT)-NOT OPTIMIZED	NON-RECURRING .	RECURRING	OPERATIONS	·	
The state of the s					
1 STRUCTUPE	20150000.	30649216.			74
2 ENGINEERING	17500000.	2250126.	- Marian - M		
NOTABILIZATION .	211309.	5614659.			
4 THERMAL	2120000.	2910971			
S S-C MECHANISMS	3520000.	2721483.			
6 FLECTPIC POWER	100312.	2511692.			
7 * PRIMARY OPTICS	3 30 00 0 0 •	8000978.			
A COMM. B DATA HANDLING	582816.	3704050.	and the state of t	()	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
9 PHEUMATICS	4215.	814092.			
10 TEST & SUPPORT EQUIPMENT	4669540.	20 706 34			
II PROGRAM MANAGEMENT	2533000.			•	
12 SYSTEM INTEGRATION	944000.	2449698.	et		
13 RELIABILITY	111600.	133800		•	
	1445220.	5820000			
14 QUALITY ACCEPTANCE					
15 TITAN INTERSTAGE	582000.	1000000			
16 # TITAN SHROUD	0.0			•	
17 SHUTTLE INTERFACES	20910000.				
18 TRAINTES & SIMULATORS	3110400.	100000.			
19 * EXPERTMENTS A & A		39000000.			
20 GROUND STATION	3251000.	800000.			
21 * NEW COMPUTERS	4550000.	0.0			
LAUNCH OPERATIONS					
22 * LV-TITAN	0 • 0	22500000.			
23 * LV-SHUTTLE		10000000			
24 S-C SUPPORT	. 0.0	4950000.			
_25 * FACILITIES	7 1347012.	658866			
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.		y	
27 * EXPERIMENT UPDATE		39000000.		<u></u>	
24 G.S.F.C. & OTHER	0 • 0	60000000-		2	
ADDITAL CONTACTOR	<u></u>		9000000.		
ORBITAL OPERATIONS	81745376.	77389312.	4000003	*	
G & A CHARGE ABLE	10545149.	9983217.	1160999•		
G & A			1100234		
SUBTOTAL	92290512.	87372528.		· · · · · · · · · · · · · · · · · · ·	
NON-G & A SUBTOTAL	14197012.	194863680.	10160979.		
TOTAL	106487520.	282236160	10100334		
NO G & A CHARGE	Y	OTAL	398884352.		
COST OF ADD'L SHUTTLE REPAIR FLE		UTT	81999968.		
	₹		480884224.		
GPAND TOTAL NO. OF FAILURES 22.40					
				•	
UPTIME (YEARS) 11.20					
UPTIME RATIO 0.75					

والمراق والمناطوم الملموس فيتواد دوي والمواجه المدود المدود المدود المدود المدود المدود المدود والمدود	PERCON PROG	RAM		1 11
	•			
		a ni a nipe garpini wagaini ya ing disanti pangaini dan matani	44 - Marie Andrew Company and	
SHUTTLE_SCHEDULE_DELAY4 + 2+0				
VAR . SURSYSTEM MITE 6.0	The state of the s			,
				· · · · · · · · · · · · · · · · · · ·

SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
1STRUCTUPE	201500000	30649216+		
		2250126.		,
3 STABILIZATION	211309	5514659		
A THERMAL	2120000.	2910971 •		
5 S-C MECHANISMS	3520000.			•
6 ELECTRIC POWER	1003154	25 11 642 •		
7 * PRIMARY OPTICS	3100000.	3784059.		
8 COMM. & DATA HANDLING	582836.	37114934		
O PNEUMATICS	4215	2010634	,	
TEST & SUPPORT FOUTPMENT	4669540.	7119000+		
11 PROGRAM MANAGEMENT	2533000 •	2448698	, , , , , , , , , , , , , , , , , , , ,	
12 SYSTEM INTEGRATION	944000+	131800	_	
13 RELIABILITY	111600	5920000		
OUALITY ACCEPTANCE	1445220 •	670000		
15TITAN INTERSTAGE	582000-	1000000		
16 # TITAN SHROUD	0.0	19970004		
17 SHUTTLE INTERPACES	20910000	100000.		
TRAINCRS & SIMULATORS	3110400.	19000000		
19 * EXPEDIMENTS A & B	50000000	800000		
20 GROUND STATION	3251000. 4550000.	0.0		
21 * NEW COMPUTERS	44,700004			
LAUNCH OPERATIONS	0.0	22500000.		
22 * LV-TITAN	0.0	10000000		
23 * LV-SHUTTLE	0.0	4950000+		
24 S-C SUPPORT	1347012	362826.		
25 * FACILITIES		150000004		
26 * SHUTTLE UPDATE FLIGHT	0.0	39000000.		
27 * EXPERIMENT UPDATE	-0.0	60000000	` -	,
28 * G.S.F.C. & ATHER	· · · · · · · · · · · · · · · · · · ·		9000000	
29 DROITAL OPERATIONS			9000000	· · · · · · · · · · · · · · · · · · ·
G & A CHARGEARLE	A1745376	77389312+	1160999•	
	10545149.	9083217.	* * .	
G & A SUBTOTAL	92290512.	87372528 •		
NON-G & A SURTOTAL	14197012.	194863680.	101609994	
TOTAL	106487520	282236160.	1010000	
*NO G & A CHARGE			398884352	
		TOTAL	75000000.	
COST OF ADDIL SHUTTLE REPAIR FL	TS		473884160•	
GRAND TOTAL			the state of the s	
NO. OF FAILURES 21.00		•		have the same the same which the same same the same same same same same same same sam
UPTIME (YEARS) 10.50			· · · · · · · · · · · · · · · · · · ·	

PERCOM PROGRAM PROGRAM NO.14 SHUTTLE SCHEDULE DELAY. . .. 2.5 TOTAL SYSTEM MITE 6.0 VAR . SUNSYSTEM SLOPE 1.25_ SHUTTLE-MAINTAINED PROGRAM RECURRING NON-RECURRING (3 SPACECRAFT)-NOT OPTIMIZED____ 2250126. 17500000. FNGINEERING 5614659. 211309. STABILIZATION 2910971. 21200000 THERMAL 2721493. 35200000. S-C MECHANISMS 25 11682. 100312. ELECTRIC POWER 8000978 33000000. 7 * PRIMARY OPTICS 3784059 582836. COMM. & DATA HANDLING NOT REPRODUCIBLE BIHO92. 4215. 9 __ PNEUMATICS 10 TEST & SUPPORT EQUIPMENT 4669540 . 7119000. 2533000. PROGRAM MANAGEMENT 2448698. 944000. SYSTEM INTEGRATION 111600. RELIABILITY 13 5820000* 1445220. QUALITY ACCEPTANCE 6700000 582000. __ 15 __ TITAN INTERSTAGE 10000000 0.0 THE TITAN SHROUD 1997000. 209100000 SHUTTLE INTERFACES 100000. 3110400. TRAINERS & SIMULATORS 39000000. 50000000 19 * EXPERIMENTS A & A 8000000 3251000. GROUND STATION 45500000 21 * NEW COMPUTERS LAUNCH OPERATIONS 225000000 22 * LV-TITAN 100000000 0.0 23 __*__ LV-SHUTTLE 49500000 S-C SUPPORT 362826. 1347012. 25 * FACILITIES 150000000 0.0 26 * SHUTTLE UPDATE FLIGHT 390000000 0.0 27 * EXPERIMENT UPDATE 600000000 PA * G.S.F.C. & OTHER 9000000 ORBITAL OPERATIONS 77 189312. 81745376. 1160999 G & A CHARGEABLE 998 3217+ 10545149+ G & A 87172528. 92290512 SURTOTAL 194863680. 14197012. NON-G & A SUBTOTAL 10160999• 282236160. 106487520+ TOTAL *NO G & A CHARGE 398884352 68823456. COST OF ADDIL SHUTTLE REPAIR FLTS 467707648. GRAND TOTAL 19.76 NO. OF FAILURES. ... 9.88 UPTIME (YEARS) UPTIME RATIO

	PERCOM PR			<u> </u>
	PROGRAM	NO.15	g to skip of specifying and the specifying and the specifying of the specifying and the specific and the specifying and the specific and the specifying and the specific and the specif	
SHUTTLE SCHEDULE DELAY. 3.0				
VAR. SUBSYSTEM_SLOPE1.25				
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
1				
SHUTTLE-MAINTAINED PROGRAM				<u>-</u>
(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING _	RECUPRING	OPERATIONS	
1 STRUCTURE	20150000.	30649216,		
2 ENGINEERING	175000000	2250126.		
3 STABILIZATION	211309	5614659.		
4 THERMAL	2120000.	2910971.	•	
5 S-C MCCHANISMS	3520000.	2721481.	the same or this six is in the same and is stored that the same and the	
6 FLECTOIC POWER	100312-	2531642	•	
7 * PRIMARY OPTICS	3100000.	9000979.		<u> </u>
8 COMM. & DATA HANDLING	582836.	3784859.		•
9 PHEUMATICS	4215.			<u></u>
10 TEST & SUPPORT FOUIPMENT	4669940•	20 / 06 34 •	•	•
11 PROGRAM MANAGEMENT		7119000.		
12 SYSTEM INTEGRATION	944000.	2448499•	and the second s	•
13 PELIABILITY		131800.		
14 QUALITY ACCEPTANCE	1445220.	5820000.		
15 TITAN INTERSTAGE				
16 * TITAN SHROUD	0 • 0	1000000.		-
17 _ SHUTTLE INTERFACES	<del>,</del> ,	1997000+		
1A TRAINERS & SIMULATORS	3110400.	100000		
19 * FXPFP1MCNTS A & B		39000000		
20 GPDUND STATION	3251000.	800000.		
21 * NEW COMPUTERS	4550000	0+0		
LAUNCH OPERATIONS			براستان والمساور والم	
22 * LV-TITAN	0.0	22500000.		•
23 * LV-SHUTTLF		10000000. 4950000.		
24 S-C SUPPORT	0.0	362825.		
25 * FACILITIES	1 147012+	15000000.		
26 * SHUTTLE UPDATE FLIGHT		39000000.		,
27 * FXPERIMENT UPDATE	0 . 0	60000000		
28 * G.5.F.C. & OTHER	0.0	1100000704		
And Constitutions			9000000	1
29 ORBITAL OPERATIONS	81745376.	77389312.	, , , , , , , , , , , , , , , , , , , ,	,
G & A CHARGEABLE	10545149*	9093217	1160999*	
G & A	92290512	87372528.		
NON-G & A SUSTOTAL	14197012.	194863680.		
TOTAL	106487520.	292236160.	10160999.	
*NO G & A CHARGE				
TING G & A CHANGE		TOTAL	398884352.	
COST OF ADDIL SHUTTLE REPAIR FLTS	*		63333280.	
GRAND TOTAL			462217472.	
			******	
NO. OF FAILURES 18.47				

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	PROGRAM	NO.16		
			الم محاسبين والمحاسب ويوم من محدد بردي المستحيدة بن مدد المحد المدد والمحدد والمدد والمدد والمدد والمحدد والمدد	
SHUTTLE SCHEDULE DELAY 6.0				
TOTAL SYSTEM MYTE 5.0				
VAR . SURSYSTEM SURPT 1.25				
1			•	
SHUTTLE-MAINTAINED PROGRAM	NON-RECURRING	necunn two	OPFRATIONS	•
(3 SPACECRAFT) -NOT OPTIMIZED				
t stoucture	20150000	30649216+		
. S ENGINCLUING	17500000.	2250126.		
3 STABILIZATION	211309.	5614659		
A THERMAL	2120000.	2910971.		`
5 S-C MECHANISMS	3520000.	2721483.	والمساوية فالوجاليان والمقاوي الميار والرجاء الداء أده والوجاء والمساوية والمساوية والمساوية	
6 FLECTRIC POWER	100712+	2531662+		* * <u>*</u>
7 * PRIMARY OPTICS	3 100000	8000878.		
A COMM. & DATA HANDLING	582836*	3784059		
9 PNEUMATICS	4214.	818092		
10 TEST & SUPPORT FOUIPMENT	4669540.	7119000+	•	
11 PROGRAM MANAGEMENT	2533000.	2445695		
	111600.	13,1800.		
13 RELIABILITY  14 QUALITY ACCEPTANCE	1445220	5820000+		
15 TITAN INTERSTAGE	582000	670000		
16 * TITAN SHROUD	0.0	1000000.	the property of the second sec	
17 SHUTTLE INTERFACES	20910000.	1997000+		
IN TRAINERS & SIMULATORS	3110400.	100000.		
19 * EXPERIMENTS A & B	5000000	39000000.		
20 GROUND STATION	3251000.	H00000.		
31 * NEW CURBITERS	4550000.	0.0		
LAUNCH OPERATIONS	0.0	22500000		
27 * LV-94UTTLE	0.0	10000000		
PA S-C SUPPORT	0.0	4950000.		
25 * FACILITIES	1347012.	3628264		
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000		
27 * EXPERIMENT UPDATE	0.0	39000000		
28 + G.S.F.C. & DYHER	0.0	60000000		
29 DROITAL OPERATIONS		*	90,00000	• •
G & A CHARGCABLE	81745376	77389312.		بدا الدام وبالشبوط ويتناون والمتمارية والمتمار والمار والمار والمار والمار
G & A	10545147.	9783217	1160999#	
SUNTOTAL.	92290512.	87372528. 194863690.		
NON-G & A SUBTOTAL .	14197012.	282236160.	10160999•	
TOTAL  *NO G & A CHARGE	106487520+			
THE D A CHARGE		TOTAL	398884352.	
COST OF ADDIL SHUTTLE REPAIR FLTS			40000000	A
GRAND TOTAL	•		438884352	
NO. OF FAILURES 14.00				•
UPTIME (YEARS) 7.00				
UPTIME RATIO 0.47				

	PERCOM PRO		and the same of the last the same of the s	<del>'</del>
	PROGRAM I			
والمراجعة والمراوية والمراوية والمراجعة فيوا أو و و و و و و و و و و و و و و و و و		الوجيدة الله الله الله الله الله الله الله الل	Service for the second	·-··
SHUTTLE SCHEDULE DELAY. 12.0			and the sale of th	
TOTAL SYSTEM MITEARARA 6.0			•	
VAR . SURSYSTEM SLOPE 1.25			والمرابع والم	
			•	
	• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •		
SHUITLE-MAINTAINED PROGRAM (3 SPACECRAET)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
·			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
1 STPUCTUPF	20150000.	30649216		
2 ENGINFERING	17500000.	2750126.	i .	
3 STABILIZATION	211309.	5614659		
4 THERMAL	2120000.	5010051*	•	
5 S-C MECHANISMS		2721483	ی در به ۱۹ و ۱۹ ه و ۱۹ ه همانتین است. این میرود از ۱۹ ه ۱۹ ه ۱۹ های این میرود از ۱۹ های این این این این این این این این این ا	
6 FLECTRIC POWER	100312.	- · · · .		
7 * PPIMARY OPTICS	582836•	37840594		
9 PHEUMATICS			,	
10 TEST & SUPPORT COULDWENT	4669540.	2070634.	1	
11 POOGRAM HANAGEMENT		7119000+		
12 SYSTEM INTEGRATION	944000.	2448698.	/	
13 RELIABILITY	L11600	1 13900		
14 QUALITY ACCEPTANCE	1445220.	5820000+	Nor REPRODUCIBLE	
	582000.		A.	
16 * TITAN SHROUD	0.0	1000000+	"TEPA	
17 SHUTTLE INTERFACES	20910000 • 3110400 •	100000.	Pop	
1A TRAINERS & STMULATORS	5000000	39000000	·	
19 * EXPERIMENTS A. 6 B	3251000.	800000.	·/8,	
21 * NEW COMPUTERS	4550000.	0.0		
LAUNCH OPERATIONS				
27 * LV-TITAN	0.0	22500000.		
23 * LV-SHUTTLE		10000000		<del></del>
24. S-C SUPPORT	0.0	4950000.		
	1347012	362826 15000000.		
26 * SHUTTLE UPDATE FLIGHT	0.0	39000000		
27 * FXPFRIMENT UPDATE 28 * G.S.F.C. & OTHER	0.0	60100000.		
En a departed a minute				
29 DRSITAL OPERATIONS			9000000	
G & A CHARGEARLE		77389112.		
G & A	10545149.	9983217	1160999.	
SUNTOTAL	92290512		and the same of th	
NON-G & A SURTOTAL	14197012.	194963680	10160999•	
TOTAL	1064,7520	282236160.	L V F (2V 7 ' * * *	
NO G & CHAPGE		TOTAL	398884352.	
COST OF ADDIL SHUTTLE REPAIR FLT			1666665.	
GRAND TOTAL	_		41 5550 976 .	
NO. OF FATLURES 9.33				

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	PROGRA	M ND . I R	······································		
	T IS LOCKTORY				
		a to relate the A or Same for Man	P. C.		
SHUTTLE SCHEDULE DELAY. 24.0			artimization of a st. The		
TOTAL SYSTEM MITE 6.0					
VAR. SURSYSTEM SURPC 1.25					
	******		• • • • • • • • • • • • • •	as as well analyse man reflect accounting assessing	
SHUTTLE-MAINTAINED PROGRAM					
(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING '	OPERATIONS		
*************************	• • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • •		
1 STRUCTURE	20150000.	30649216.			
5 ENCINGEBING	17500000.	2250126.			
3 STABILIZATION	211309.	5614659			
4 THERMAL	2120000.	29109/10		•	
5 S-C MECHANISMS	3520000.	2721493.			<del></del>
S CLECTRIC POWER	100312.	2511682+			
7 * PRIMARY OFFICS'	3 100000	BOOOR78			
B COMM. & DATA HANDLING	582836.	3784059.		•	
9 PNEUMATICS	4215.	818092.			
10 TEST & SUPPORT COULDMENT	4669540.	2070634.		•	
11 PROGRAM MINAGEMENT	2533000.	7119000	والمواقة المراجعين المداميين والمراج المستويل المستويل والمراج		
12 SYSTEM INTEGRATION	944000.	. 2448698.			
13 OFLIABILITY	111600.	131800.			
14 OUALITY ACCEPTANCE	1445270.	5820000 ·			
15 TITAN INTERSTAGE	582000•	670000.			
16 * TITAN SHROUD	0.0	1000000.			•
17 SHUTTLE INTERFACES	20910000	1997000-			
IR TRAINERS & SIMULATORS	3110400.	100000.			
19 * FXPERIMENTS A 6 8	5000000.	*0000000 ·			
20 GROUND STATION	3251000.	800000.			
21 * NEW COMPUTERS	4550000.	0.0			
LAUNCH OPFRATIONS					
22 * LV-TITAN	0.0	22500000.			
23 * LV-SHUTTLE	0.0	10000000.			
24 S-C SUPPORT	0.0	4950000.			
25_* FACILITIES	1347012.	762926.			
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.	1		
27 * EXPERIMENT UPDATE	0.0	39000000.			
28 * G.S.F.C. & OTHER	0.0	60000000	-		
			<u></u>		
29 OPBITAL OPERATIONS	,		9000000	-	, -
G & A CHARGEARLE	81745376	77389312.			
GEA	10545149.	9983217.	1160999.		
SUBTOTAL	92290512.	873725284		·	
NON-G & A SURTOTAL	14197012.	194863680.			
TOTAL	106487520	194863680. 282236160	10160999		
*NO G & A CHAPGE			· · ·		
		_ TOTAL	398884352.		
COST OF ADD'L SHUTTLE REPAIR FLTS			0.0		
GRAND TOTAL			398884352.		
NO. OF FAILURES 5.60					
UPTIME (YEARS) 2.80		•			

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	PROGRAM			
				* •
SHUTTLE_SCHEDULE_DELAY0.5			,	
TOTAL SYSTEM MITE 9.0			<del></del>	
AR. SURSYSTEM SLIPE 1.25				
4 - 1 1: 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -				
· · · · · · · · · · · · · · · · · · ·				
SHUTTLE-MAINTAINED PROGRAM				
(3 SPACECRAFT)-NOT OPTIMIZED		RFCURRING	DPERATIONS	1
			**********	
1 STRUCTURE	20150000+	30644216+		
2 FNGINEERING	17500000.	2250126.		
3 STABILIZATION	2120000	2910971		
4 THERMAL				
5 S-C MECHANISMS	213926	5399098-	<u> </u>	
6 FLECTRIC POWER 7 * PRIMARY OFFICS		8000878		•
8 COMM. & DATA HANDLING	1242951	8069922		
9 PHEUMATICS				•
10 TEST & SUPPORT FOUTPMENT	4669540.	2070634.		
11 * PROGRAM MANAGEMENT			fr	
12 SYSTEM INTEGRATION	944000	2448693.		•
17 RELIABILITY		1 5 5 5 0 0 0		
14 QUALITY ACCEPTANCE	1445220.	5820000.	•	
15TITAN INTERSTAGE	582000.	670000,		
16 * TITAN SHROUD	0.0	1000000.	•	
17 SHUTTLE INTERFACES	20910000.	1997000+		
IN TRAINERS & SIMULATORS	3110400.	100000.		
19 * EXPERIMENTS A & B	5000000.		والمستقدية ومند ومستقد والمستقدين والمستقدين والمستقدين والمستقد والمستقد والمستقد والمستقد	
20 GROUND STATION	3251000.	800000.		
21 * NEW COMPUTERS	4550000.	0.0		
LAUNCH OPERATIONS			ومسائيس فللمساد للهوا الأنفس المسيور والأراد والمراج و	
22 + LV-TITAN	0.0	22500000.		
		100000000,		
24 S-C SUPPORT	0.0	4950000.		
	1347012.	352826.		<del></del>
26 * SHUTTLE UPDATE FLIGHT	0 • 0 0 • 0			t
27 * FXPERIMENT UPDATE	0.0	60000000		
29 * G.S.F.C. & OTHER	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	110000000		
29 ORBITAL OPERATIONS			9000000	
G & A CHARGEABLE	02763232	91828400.		
G E A	10676452	11845958.	1160999.	
SUSTOTAL	93439680.			
NON-G & A SUBTOTAL	14197012.	194863680.		
TOTAL	107636688.		10160999.	
*NO G & A CHAPGE				
Country of the first exercise (Control of the Control of the Contr		TOTAL	416335104.	
COST OF AND IL SHUTTLE REPAIR FL		- · · · · · · · · · · · · · · · · · · ·	58421 008.	
GRAND TOTAL	•		474756096	
NO. OF FAILURES 17.58				

	2000044	NO. 20		
	PROGRAM			
HUTTLE SCHFDULE DELAY 1.0				
OTAL SYSTEM MITE 9.0			•	
AR. SURSYSTEM SLOPE 1.25				
				•
			• • • • • • • • • • • • • • • • • • • •	
SHUTTLE-MAINTAINED PROGRAM		2000 146	COCDATIONS	
(3 SPACECRAFTI-NOT OPTIMIZED	NON-RECURRING _	RECORNING	OPERATIONS	400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 - 400 -
	20150000	30649216.		
1 STRUCTURE	17500000	2250125.		•
2 ENGINEEPING	450541.	11973880.		
3 STABLE TATION THERMAL	2120000.	2919971.		
S S-C MECHANISMS	3520000.	2721493.		
6 ELECTRIC POWER	213926.	5390099.		
7 * PRIMARY OPTICS	3300000 •			
B CONN. 6 DATA HANDLING	1242961+	8069922.		
9 PNEUMATICS	A988.	1744672.		
TEST & SUPPORT COULPMENT	4669540.	2070634.		,
11 PRINGRAM MANAGEMENT	2573000	7119000+		No
12 SYSTEM INTEGRATION	944000.	2449699+		REPRODUCIBLE
13 RELIABILITY	111600.	1 3 3 8 0 0 •		~ rep
14 QUALITY ACCEPTANCE	1445220.	5820000.		PO
15 TITAN INTERSTAGE	582000.			
IS * TITAN SHROUD	0.0	1000000.		~C'/p.
17 SHUTTLE INTERFACES		1997000.		
18 TRAINERS & STMULATORS	3110400.	39000000.		` `
19 * EXPERIMENTS A & B	325(000•	3900000		
20 GROUND STATION	4550000			<u> </u>
21 * NEW COMPUTERS				
LAUNCH OPERATIONS				vi. —
22 # LV-TITAN	0.0	22500000•		•
23 * LV-SHUTTLE	0.0	10000000		
24 ዓ–ር ዓህቦውበጽፕ	0.0	49500004		
	1347012.			
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.		
27 * EXPERIMENT UPDATE	0.0	39000000		
29 * G.S.F.C. & OTHER	0.0	60000000		•
المراجعة المستخدم المستخدين المراجعة المستخدم المستخدم المستخدين المستخدم ا			9000000	
29 ORBITAL OPERATIONS	00767070	01020400	4000000*	
G & A CHARGEARLE	82763232	91828400. 11845858.	1160999.	· · · · · · · · · · · · · · · · · · ·
G E 4	(0676452• 93439680•	103674256	*1 (1/4.3.4.5.4)	
SUNTRITAL	14197012.	194863680.		
NON-G & A SUSTOTAL	107636688	298537728	10160999	
TOTAL  #NO G & A CHARGE	101030000			
FNU IS & A EMARGE		TOTAL	416335104.	
COST OF ADD'L SHUTTLE REPAIR FL	rs		53999936.	
			470334976	
NO4 OF FAILURES 16.80				

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	PROGRAM				
The second secon					
SHUTTLE_SCHEDULE_DELAY1.5				, w	,, ,
TOTAL SYSTEM MITF 9.0				•	
VAR, SURSYSTEM_SLOPE 1.25					
		•			
	· · · · · · · · · · · · · · · · · · ·	**********			
SHUTTLE-MAINTAINED PROGRAM (3_SPACCCRAFT)-NOT_OPTIMIZED	NON-PECUPPENG	RECURRING '	OPERATIONS		
- (3 2 2 M M ( ) C M M ( ) - M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M ( ) M M ( ) M M ( ) M M ( ) M M ( ) M ( ) M ( ) M ( ) M M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M ( ) M (				<u> </u>	
1 STOUCTURE	20150000	30649216.			
2 FNGINGPING	17500000.	2250126.			
3 STABILIZATION		11973980.			
4 THERMAL	2120000	2910971			4
5 S-C MECHANISMS	3520000.	2721483.		, ₁₄	
6 FLECTRIC POWER	213926.	5 19909B.			
7 * PRIMARY OPTICS	3300000			<del></del>	
B COMM. & DATA HANDLING	1242961.	8069922			
9 PNEUMATICS	вовн.	1744672.			
10 TEST & SUPPORT EQUIPMENT	4669540 •	2070634.		, · · · · · · · · · · · · · · · · · · ·	
II PROGRAM MANAGEMENT					
12 SYSTEM INTEGRATION	944000.	, 2448698	•	•	
17 PELIAPRITY	111600.			_,,	
14 QUALITY ACCEPTANCE	1445220.	5820000 • 🚎 🥍			
_15 TITAN INTERSTAGE		670000.			
16 * TITAN SHOOUD	0.0	1000000.			
17 SHUTTLE INTERFACES		1997000.			
18 TRAINERS & SIMULATORS	3110400.	100000.			
19 * EXPERIMENTS A & B	3251000+	39000000,			
26 GPHUND STATION	4550000	0.0			
21 * NEW COMPUTERS	4,,,0000			· · · · · · · · · · · · · · · · · · ·	
LAUNCH OPERATIONS					
22 + LV-TITAN	0.0	22500000.			
23 * LV-SHUTTLE	0.0	10000000.			
24 S-C SUPPORT	0.0	4950000.			
25 + FACILITIES	1347012.	362926.			
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000			
27 # EXPERIMENT UPDATE	0.0	79000000			
29 * G.S.F.C. & OTHER	0.0	60000000.			
			9000000		<del></del>
29 ORBITAL OPERATIONS	82763232.	91828400+	7000000		
G & A CHARGEABLE	10676452	11945858	1160999.		
G & A	93439680				
SUSTOTAL NON-G & A SUBTOTAL	14197012.	194863680.			
TOTAL	107636688	298537728	10160999.		
IND G & A CHAPGE	# W   W # 55 C F 1 F W #				
AND A A CHARGE		TOTAL ,	416335104.		
COST OF ADD'L SHUTTLE REPAIR FL	TS	. –	50000000		
GRAND TOTAL			466334976		
NO. OF FATLURES 15.00					

	PROGRAM N	10,22	terretarions and while the second control on the province section.	*
and the same plantage of the party and the party of the party of the same of the party of the pa		. And I are the second and to the State Section Sectio		
TOTAL SYSTEM MITE 9.0			The state of the s	
VAR. SUBSYSTEM SLIPE L.25	THE PARTY NAMED IN COLUMN TWO IS NOT THE OWNER OF THE PARTY NAMED IN COLUMN THE PARTY NAMED IN C		-	
SHUTTLE-MAINTAINED PROGRAM			DOEDATIONS	
(3 SPACECRAFY)-NOT OPTIMIZED		RECURRING	UPERATIONS	, , , , , , , , , , , , , , , , , , , ,
		**************************************		
1 STRUCTURE	20150000	2250126		
, 2 ENGINFFRING	450641.			
3 STABLUTATION	2120000	2910971+	Marketine the state of the stat	
4 THERMAL 5 S-C MFCHANISMS	3520000.	2721483.		
6 FLECTRIC POWER	213926.	5397098+		_
7 # PRIMARY OPTICS	3300000.	B000878•		
B COMM. & DATA HANDLING	1242961.	80699224		•
9 PNEUMATICS	គមម	1744672.		
TO TEST & SUPPORT FOULPMENT	4669540.	2070634+		
11 PROGRAM MANAGEMENT	2533000	7119000.	· · · · · · · · · · · · · · · · · · ·	
12 SYSTEM INTEGRATION	944000.	2448698*		
13 PELIABILITY	111600+	133800		
14 QUALITY ACCEPTANCE	1445220.	670000	Pa	
15 TITAN INTERSTAGE	582000. 0.0	1000000.		
16 * TITAN SHROUD	20910000	1997000	70.	
17 SHUTTLE INTERFACES	3110400.	100000.	Robuc	,
18 TRAINCRS & STMULATORS	5000000	39000000		<u> </u>
19 # EXPERTMENTS A & B PORTION STATION	3251000.	800000+		8 ₁
21 * NEW COMPUTERS	4550000.	0.0		`K'
The state of the s			`	`_
LAUNCH OPERATIONS				
22 # LV-TITAN	0.0	22500000		
23 * LV-SHUTTLE	0 • 0	10000000+		<u></u>
24 S-C SUPPORT	0.0	4950000		
25 * FACILITIES	1347012	362826+		التركيبية التي التي التي ويون في التي التي التي التي التي التي التي الت
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000+		* . *
27 * EXPERIMENT UPDATE	 0.0	60000000	de anno 1 agrando for many in the transport of the second	•
28 * G.S.F.C. & OTHER	0.10	170,000		
			9000000	- ,
29 OPSITAL OPERATIONS	82763232.	91929400.		سيريف والمستخبر والمستخبرة والمستحدث
G & A CHARGEABLE	10676452.	11845858. "	1160999•	
G E A	93439680.	103674256		
SUBTOTAL NON-G & A SUBTOTAL	14197012.	194963680.		
TOTAL	107636688.	299537729+	10160999.	<del></del>
*NO G & A CHARGE				
		TOTAL		
COST OF ADD'L SHUTTLE REPATR FLT	5		46363632.	
GRAND TOTAL		,,,, _ ,, , , , , , , , , , , , , , , ,	462698496.	
NO. OF FAILUPES 15.27				
UNTIME (YEARS) 11.45		•		

والمرابية فرمستها والمتناوية والمتنودة والمرابي فيهر والمتنوعة والمتنوعة والمتنوة والمتنودة والمتنوع والمتنوع والمتنوع والمتنوع والمتنوع والمتنوعة				
•	PROGRAM N		ي سيد پر منوند در	
SHUTTLE SCHEDULE DELAY 2.5	- " - "			
TOTAL SYSTEM MITE 9.0 VADSUBSYSTEM_SLOPF 1.25				
AND * "- AD C. L. O. C. L. O. C.				
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	* * * * * * * * * * * * * * * * * * *	
SHITTI FARAINTAINED PROGRAM	-			
(3 SPACECHAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
	• • • • • • • • • • • • • • • • • •	*****	*********	
1 STRUCTURE		30649216		
P FNGINFERING	17500000.	2250126.		•
3 STABILIZATION	910000	2910971.		·
4 THERWAL	2120000		and any other training and reserve and passage of the contract	
S S-C MICHANISMS	213926.	5399099.	بالمراجعة والمراجعة والمراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة	
7 * ORIMARY OPTICS				*
A COMM. & DATA HANDLING	1242961.	8069922		
9 PNCUMATICS				
10 TEST & SUPPORT FOULPMENT	4669540+	20/06/14.		
11 PROGRAM MANAG MENT	2533000	7119000.		
12 SYSTEM INTEGRATION	944000.	2449698.		
17 PELIABILITY	111600	131800	والمستوي والمستوي والمستوية والمستوية والمستوية والمستوية والمستوية والمستوية والمستوية والمستوية والمستوية	
14 QUALITY ACCEPTANCE	1445220+	5920900.		
15 TITAN INTERSTAGE	582000.	**************************************	والمراجعة	
16 * TITAN SHROUD	0.0	1000000.		
17_ SHUTTLE INTERFACES				
18 TRAINERS & SIMULATORS	3110400.	100000.		
19 4 FXPERIMENTS A & B				
20 GROUND STATEON	3251000.	A00000.		
PI * NEW CHAPHTERS	45500000	0.0		
A TOUR OF STATE ONE				
LAUNCH OPERATIONS	0.0	225000000		
<del>-</del> :	0.0			
23 * LV-SHUTTLE	0.0	4950000		
25 FACILITIES	1347012.	.058591		
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000		
27 * EXPERIMENT UPDATE	0.0	39000000		
28 * G.S.F.C. & OTHER	0.0	60000000	•	•
			9000000	
29 ORBITAL OPERATIONS		01020404		
G & A CHARGEABLE	82763232	91829400 11845858.	1160999.	
G & A	10676452.			
SUBTOTAL SUBTOTAL	14197012	103674256.		
NON-G & A SUSTOTAL Total	107636688.		10160999•	
*NO G & A CHARGE	307110171110			
AND O D W CHMAGE	Ŧ	OTAL	416335104.	
COST OF ADD'L SHUTTLE REPAIR FLTS			43043472.	
GRAND TOTAL			459378432.	
NO. OF FAILURES 14.61			and the second s	
UPTIME (YEARS) 10.96				
UPTIME RATIO 0.73		,,,		

## PERCOM PROGRAM PROGRAM NO.24 SHUTTLE SCHEDULE DELAY... 3.0 TOTAL SYSTEM MITTERS 9.0 VAR. SUBSYSTEM SLOPE.... __1.25 SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFY)-NOT OPTIMIZED NON-RECURPING RECURRING 20150000. 30649216. FNGINFERING 175000000. 2250126. STABILIZATION 450641. 11973480. THERMAL 2120000. 2910971. S-C MECHANISMS 3520000. 2721483. FUTCIPIC POWER 213926. 5 3000000 7 # PRIMARY OPTICS 31000000. 8000978. 8069922. COMM. & DATA HANDLING 1242961. 1744472. PNEUMATICS 8988. TEST & SUPPORT EQUIPMENT 4669540. 2070634. 10 2533000. 7119000. PROGRAM MANAGEMENT SYSTEM INTEGRATION 944000. 2449698. 12 RELIABILITY 111600. 133600. 13 5820000. QUALITY ACCEPTANCE 1445220. 14 582000. 670000. IS TITAN INTERSTAGE 16 * TITAN SHROUD 0.0 taganon. 17 SHUTTLE INTERFACES 20910000. 1997000. TRAINCRS & SIMULATORS 3110400. 1000000 19 * EXPERTMENTS A & B ___ 50000000 390000000. 600000. 20 GROUND STATION 3251000. 4550000. PT * NEW COMPUTERS 1 LAUNCH OPERATIONS 22 * 0.0 225000000. LV-TITAN 23 LV-SHUTTLE 10000000. 0.0 24 S-C SUPPORT 0.0 4950000. 362826. 25 * FACILITIES 1347012. 26 * SHUTTLE UPDATE FLIGHT 150000000. 0.0 27 * EXPERIMENT UPDATE 390000000 0.0 600000000 28 * G.S.F.C. & STHER ORBITAL OPERATIONS 9000000. G & A CHAPGEABLE 82763232. 91828400. 1160999. 11845858. GEA 10676452. SUBTOTAL 97439680. 103674256. NON-G & A SUSTOTAL 14197012. 194863680. TOTAL 107636688* 29853772A. 10160999

*NO G & A CHARGE

**NO G & A CHARGE

**TOTAL 416335104.

COST OF ADD'L SHUTTLE REPAIR FLTS 40000000.

GRAND TOTAL 456335104.

NO. OF FAILURES... 14.00

UPTIME (YFARS)... 10.50

UPTIME RATIO.... 0.70

	PERCOM PR	DGRAM		1		
PROGRAM NO.25						
ودورات المراجع الم	****		بالمعادة ويوني المسترية والمسترية وا	<u></u>		
SHUTTLE SCHEDULF DELAY						
TOTAL SYSTEM MITF 9.0						
/AR . SUPSYSTEM SLOPE 1 . 25						
, ,',		• • • • • • • • • • • • • • • • • •				
SHUTTLE-MAINTAINED PROGRAM		OFCUNDING	ODEDATIONS			
(3 SPACECRAFT) -NOT OPTIMIZED	NON-BECORPING	INT COMMA LING	OPERATIONS	•		
	20150000	30640216.				
1. STRUCTURE.	17500000	2250126				
3 STABLLIZATION	2120000	2010071	The second secon	,		
5 S-C MECHANTSMS				·		
6 ELECTRIC POWER	213926.	5399099.	<u>aman yang menerupa, di Malit. 1995 ada ali-12 Pyrapedatan di Permitikana (munik). 1984-ada di Apin di Pali di</u>	: -: - <del>-</del>		
7 * PRIMARY OPTICS	3300000	8000A7A		<u></u>		
B COMM. & DATA HANDLING	1242961	8069922.				
9 PHEUMATICS	8088.	1744672.	and the state of t			
10 TEST & SUPPORT FOULPMENT	4669540 •	2070634.	•			
11PROGRAM MANAGEMENT	2533000.	71 L≎000 •	4			
12 SYSTEM INTEGRATION	944000.	2448698.		,		
13RELIABILITY	111600.					
14 QUALITY ACCEPTANCE	1445220.	5A20000.				
	582000•	2.47	فيقتنين فيبين والمنابض والارتفان والمناب والمناب والمناب والمناب والمناب			
16 * TITAN SHROUD	0.0	1000000.				
17 SHUTTLE INTERFACES	20910000.		me the same of the			
18 TRAINTPS & SIMULATORS	3110400.	100000.				
19 * EXPERIMENTS A.S.B.	5000000 3251000.	39000000				
20 GPOUND STATION 21 * NEW COMPUTERS						
SI A MEM CHANGERS	4570000			•		
LAUNCH OPERATIONS						
22 + LV-TITAN	0.0	22500000.				
23_ *LV-SHUTTLF	0.0	10000000.				
24 S-C SUPPORT	0.0	4950000				
	1347012.	162826		<u> </u>		
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.	•			
27 * EXPERIMENT UPDATE	. 0.0	39900000.				
28 * G.S.F.C. & OTHER	0.0	600000000	•			
			9000000			
29 ORBITAL OPERATIONS	67747070	01020400				
G & A CHARGEABLE	10676452.	11845858.	1160999.			
G & A	93439680.		21001114			
NON-G & A SUBTOTAL	14197012.	194863680.	· · · · · · · · · · · · · · · · · · ·			
TOTAL	107636688	298537728.	10160999•			
#NO G & A CHARGE				<u></u>		
THE G O A CHANGE		TOTAL	416735104.			
COST OF ADD'L SHUTTLE REPAIR FL	'S		25999984.			
GRAND TOTAL			442334976.			
NO. OF FAILURES 11.20			• • • • • • • • • • • • • • • • • • • •			

	PERCOM P		•	
	PROGRAM	NO.26		
The second section is the second section of the second section of the second section s		and applying and the tree of the particular		A REAL OF THE PARTY OF THE PART
SHUTTLE SCHEOULE DELAY 12.0				
TOTAL SYSTEM MITE 9.0			•	
VAR. SUBSYSTEM SLOPE 1.25		and the first state of the first state of the state of th		
			•	
	***********	••••••		
SHUTTLE-MAINTAINTD PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED	NON-OSCHODING	RECURRING	OPERATIONS	
4. AMAGIGIAN ) THUI THE EMILEN				
1 STRUCTURE	20150000.	30649216.		
2 ENGINETRING	17500000.	2250126.		•
3 STABLETATION	450641.	11973880.		
4 THENMAL	2120000.	2910971.		
S-C MECHANISMS	3520000.	2721463.		
6 FUECTRIC POWER	213926.	5700008.		•
7 * PRIMARY DOTICS	3700000.	.8000878.		
9 COMM. & DATA HANDLING	1242961.	8069922.	1	4
9 PREUMATICS 10 ICST & SUPPORT EQUIPMENT	8988.	1744672.		
10 TEST & SUPPORT EQUIPMENT	4669540 •	2070634.	/ W	0r . ·
II PROGRAM MANAGEMENT	2533000.	7119000.		· RED
12 SYSTEM INTEGRATION	944000.	2448698.		OT REPRODUCIBLE
ETETET		1 13400.		
14 DUALITY ACCEPTANCE	1445220.	5/20000.		18/5
15 TITAN INTERSTAGE		670000		
16 * TITAN SHROUD	0.0	1000000.		
17 SHUTTLE INTERFACES	20910000.	100000.	سوا ادر ویرونورویش هیرسودنسروستند چواهندر <u>نیارسدنس</u>	
19 TRAINFRS & SIMULATORS	3110400.			
19 * EXPERIMENTS A & B	3251000.	800000	ند بالمحافظة في المولوم الدينة بين الدين بارين والمولوم والمولوم والمولوم والمولوم والمحافظة والمولوم والمحافظة	
20 GROUND STATION 21 * NEW COMPUTERS	4550000			
TATE MEN CHANGER				
LAUNCH OPERATIONS				
22 * LV-TITAN	0.0	225000000		
27 * LV-SHUTTLE	0.0	10000000.		
24 S-C SUPPORT	0.0	4950000.		
25 * FACILITIES	1347012.	362826.		
26 + SHUTTLE UPDATE FLIGHT	0.0	15000000.		
27 * EXPERIMENT UPDATE	0.0	39000000.		والمراقع والم والمراقع والمراقع والمراقع والمراقع والمراقع والمراقع والمراق
29 * G.S.F.C. & OTHER	0.0	60000000.		
29 DROITAL OPERATIONS			9000000	
G & A CHAPGEABLE	82763232.	91828400.		
G & A	10676452.	11845858.	1160999•	
SUBTOTAL	93439680	103674256		
NON-G & A SUBTOTAL	14197012.	-	1.01.60000	
TOTAL *NO G & A CHARGE	107636688.	298537728.	LUI DU YYY	
FNU G & A CHARGE		YOTAL	416335104.	
COST OF ADDIL SHUTTLE REPAIR FLI		_ TOTAL	10000000.	
GRAND TOTAL	<b>J</b>		426334976+	
NO. OF FAILURES 8.00			manufacture of the second of t	
UPTIME (YEARS) 6.00				
Oction (Indianalisme) GROV				

•••

PERCOM PROGRAM								
	PROGRAM N	10.2A	•	•				
SHUTTLE SCHEDULE DELAY 0.5			emple telementation, where side is the second section of the section of th					
TOTAL SYSTEM MITF 12.0								
VAR. SUBSYSTEM SLOPE 1.25								
•••••	••,••••,••••	• • • • • • • • • • • • • • • • • • • •						
SHUTTLE-MAINTAINED PROGRAM	NON-OFFINATIVE	DECHINATAG	0000171000					
(3 SPACECRAFT)-NOT OPTIMIZED	NUN-KCCURKING	HECURKING	UPCRATIONS					
1 STRUCTURE	20150000.	30549216.						
2 ENGINEERING	17500000.	2250126.						
3 STABILIZATION				•				
4 THERMAL	2120000.	2910971.						
5 S-C MECHANISMS		2721483.						
S FLECTRIC PRIMER	365926.	9212755.	. 1	<i>,</i> .				
7 # PRIMARY BOTTES	3300000	8000878+						
B COMM. 6 DATA HANDLING	2125532.	13800008.		•				
9 PNEUMATICS	፣ናንፖህ•	2993481.						
10 TEST & SUPPORT EQUIPMENT	4669540.	2070634.						
11 PROGRAM VANAGEMENT	2533000	7119000.						
12 SYSTEM INTEGRATION	944000.	2448698 <b>•</b>	,					
13RELIAGILITY	111600	131800.		ORODUCIBLE -				
14 QUALITY ACCEPTANCE	1445220.	5820000.	"O ₂					
15 TITAN INTERSTAGE	542000.	670000.		<del></del>				
16 * TETAN SHROUD	0.0	1000000.	* (**)	٥ _{٥-}				
17 SHUTTLE INTERFACES	20910000	1997000.		"On				
TRAINERS & SIMULATORS	3110400.	100000.	`.	~ UC1.				
19 * EXPERIMENTS A & B	5000000.	39000000.		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
SO GROUND STATION	3251000.	800000.		` <b>`</b> E				
21_# NEW COMPUTERS	4550000.			<del></del>				
LAUNCH OPERATIONS								
22 * LV-TITAN	0.0	22500000.						
23 * _ LV-SHUTTLE								
24 S-C SUPPORT	0.0	4950000.	mands descentished on our of managed supersult — stadens (1844-1844-1844-1844-1844-1844-1844-1844					
25 * FACILITIES	1347012.	342826.						
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.						
27 * EXPERIMENT UPDATE	0.0	39000000.						
29 * G.S.F.C. & OTHER	0.0	60000000.						
				· · · · · · · · · · · · · · · · · · ·				
29 ORBITAL OPERATIONS			9000000	• :				
G & A CHARGEABLE	841240484	111131056.						
G & A	10851997.	14336158.	1160999.					
SURTOTAL	94976032.							
NON-G & A SUBTOTAL	14197012.	194863680.	4.04.4.000					
TOTAL	109173040.	320332800.	10160999•					
WND G & A CHARGE	_	OYAI	A 7 D L E L E G O					
COST OF ADDIL SHUTTLE REPAIR FL	T	UIAL	439666688					
	,		371 99984 •					
GRAND TOTAL			476866560.					
NO. OF FAILURES 13.44 UPTIME (YEARS) 13.44								

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		PROGRAM	0F • UN		
	ENT AND A GLASSING N TO THE	,		⊤ en	and the state of t
SHU	TTLE SCHOOLE DELAY. 1.5				V 44 A A A B RESIDENCE CONTROL OF THE SECOND
TOT	AL SYSTEM MITE 12.0				
VAR	1. SUBSYSTEM SLOPE 1.25		w 11		• · · · · · · · · · · · · · · · · · · ·
		-			
• • •	*************************	• • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	•••••	
	NUTTLE-MAINTAINED PROGRAM	Non accupating	accupatus	ADED ATTONO	
[3	SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS _	
1	STRUCTURE	20150000.	30649216.	**************	
;	ENGINEERING	17500000.	2250126.		- us more that, we can be a first to the contract of the contr
3	STARILIZATION	770620.	20475984.		,
4	THERMAL	2120000.	2910971.		
5	S-C MECHANISMS	3520000.	2721483.		
	ELECTRIC POWER	365826.	9232755.		
7	* PRIMARY -OPTICS	3300000.	RD00878.		
n	COMM. 5 DATA HANDLING	2125532.	13800008.		4
9	PNEUMATICS	15370.	2983483.		
10	TEST & SUPPORT FOUTPMENT	A669540.	20706 14.		/
11	PROGRAM MANAGEMENT	2533000.	7119000.		
12		944000•	. 2448698.		· No.
13		111600.	133800.		Nor .
1,4		1445220.	5820000.		REPRODUCIBLE.
	TITAN INTERSTAGE	582000.	670000		\ \P\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	* TITAN SHPOUD	0.0	1000000.		, O),
	SHUTTLE INTERFACES	50910000.	1997000.		······································
18		3110400.	100000.		` '8/^
	* EXPERIMENTS A S B	5000000.	39000000.		
	GROUND STATION	3251000.	800000. 0.0		
	* NEW COMPUTERS	4550000.			
	LAUNCH OPERATIONS				
22	* LV-TITAN	0.0	22500000.		
	* LV-SHUTTLE	0.0	10000000.		
24	<del></del>	0.0	4950000.		
25	* FACILITIES	1347012.	362826.		
26	* SHUTTLE UPDATE FLIGHT	0.0	15000000.		
27	* EXPERIMENT UPDATE	0.0	39000000.		
28	* G.S.F.C. & OTHER	0.0	60000000		
	A				
29	ORBITAL OPERATIONS			9000000.	
	G & A CHARGEABLE	8412404B	111133056.		, , , , , , , , , , , , , , , , , , ,
	G & A	10851997.	14336158.	1160999.	
	NON-G & A SURTOTAL	94976032.	125469200. 194863680.		
		14197012.		10160000	
· · · · · ·	TOTAL  *NO G & A CHARGE	109173040.	320332800.	FO: 90444+	
	THE G P A CHARGE	,	TOTAL	439666688	
	TOOST OF ADDIL SHUTTLE REPAIR FLTS			32222208.	
	GRAND YOTAL			471888896.	
	NO. OF FAILURES 12.44			The state of the s	
	UPTIME (YEARS) 12.44				
	UPTIME RATIO 0.83				

	PERCOM PRO	GRAM		
	PROGRAM N	0.31	4	
		the second of the second secon		·
SHUTTLE_SCHEDULE, DELAY		, pre		
TOTAL SYSTEM MITE 12.0 VAR. SUBSYSTEM SLOPE 1.25				
_VAR •SURSYSTEM_SI_DPC •.* + *1 • 6.2				•
		,		,
SHUTTLE-MAINTAINED PROGRAM			OREDATIONS	
(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
		30649216		
1	20150000+	2250126.		
2 ENGINCERING	770620			
3 STABILITATION	2120000	2910971•		-
4 THERMAL	3520000	2721483		
5 S-C MECHANISMS	365826.	92 12 755.		
7 * PRIMARY OPTICS	3300000+			
8 COMM. & DATA HANDLING	2125532 *	13000008.	,	
9 PHENMATICS	15370	2981483.	t .	•
TO TEST & SUPPORT EQUIPMENT	4669540•	2070634.	•.	
11 PROGRAM MANAGEMENT	2533000.	7119990+ 2449698+		•
12 SYSTEM INTEGRATION	944000	133900+	•	
13RELIABILITY	111600	5920000		
14 QUALITY ACCEPTANCE	582000•	670000		
15TITAN INTERSTAGE	0.0	1000000+		
16 * TITAN SHOOUD	20710000.	1997000		
17 SHUTTLE INTERFACES	3110400.	100000.		
19 * EXPERIMENTS A 6 B	50000004	390000000+		
20 GROUND STATION	3251000.	800000		
21 * NEH COMPUTERS	4550000			•
LAUNCH OPERATIONS				
22 * LV-TITAN	0.0	22500000		
23 * LV-SHUTTLE				
24 S-C SUPPORT	0.0	4950000• 362826•	And Million or a supplemental s	
25 * FACILITIES	1347012.	15000000		<del></del>
" 26" + SHUTTLE UPDATE FLIGHT	0.0	39000000		
27 * EXPERIMENT UPDATE		60000000	,	
28 * G.S.F.C. & TIHER	V			
29 ORBITAL OPERATIONS		<del></del> =	9000000.	
G & A CHARGEARLE	84124048.	111133056		
G & A	10851997+	14136158.	1160999.	
SUBTOTAL	94976032+	125469200		
NON-G & A SUBTOTAL	14197012.	.08866884P1 .008956026	10160999	
TOTAL	109173040.	320 3 178000		
NO G & A CHAPGE		TOTAL	439666688.	
			30000000	
COST OF ADDIL SHUTTLE REPAIR FL	1 3		469666560.	
GRAND TOTAL NO. OF FAILURES 12.00				-
NO. OF FAILURES 12.00 UPTIME (YEARS) 12.00	•	•		

	PERCON PROC			
والمراجعة والمرا	PROGRAM NO	1.33		
AR MANAGE AT ME US TO A 18 TO THE TOTAL PROPERTY.	and descriptions the later of t			
SHUTTLE SCHEDULE DELAY 3.0		• • •		
TOTAL SYSTEM MITT 12.0				
VAR. SUBSYSTEM SLOPE 1.25				
,	.,,	• • • • • • • • • • • • • • • • • • • •	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	<del>-</del> <del></del>
SHUTTLE-MAINTAINED PROGRAM		BECURRING	OPERATIONS	
(3 SPACECRAFT)-NOT OPTIMIZED	MUN-RECORKING			
***********	20150000	30649216	المسينين والمال المنتسات المنتسات	
1 STRUCTURE	17500000	2250126.		
P ENGINEERING	770620.	20475984		
3 STABLETATION	2120000.	2910971.	•	
4 THERMAL 5 S-C MECHANISMS	3520000			M+ d
S ELECTRIC POWER	3658264	92 12 755 ¢ 86 0 9 8 7 8 \$		
T * ORIMARY OPTICS	3300000.	13900008.	W	1
A CONN. & DATA HANDLING	2125532 • 15370 •	2981491.	man and a second and an arrangement of the second and an arrangement of the second and are second as a	
9 PHEUMATICS	4669540.	2070514.		•
. IN TEST & SUPPLIES EQUIPMENT	2531000-	7119000	and the second s	
11 PROGRAM MANAGEMENT	944000.	2445695	,	
	111600.	133400.		
A COPOT ANCE	1445270.	5820000		
15 TITAN INTERSTAGE	582000	1000000		•
16 & TITAN SHROUD	0.0	1997000	and the state of t	
SHUTTLE INTERFACES	20910000+ 3110400+	100000.		
18 TRAINERS & STMULATORS	50000000	39000000.		
19 # EXPERTMENTS A_B B	3251000+	800000 ·		
20 GROUND STATION	4550000.	0.0	ا الله الله الله الله الله الله الله ال	
21 * NEW COMPUTERS	,			
LAUNCH OPERATIONS		22500000.		•
22 * LV-TITAN	0 • 0	10000000		
23_ * LV-SHUTTLE		4250000		
24 S-C SUPPORT	1347012.	362826.		
25 * FACILITIES	0.0	150000000	•	
26 * SHUTTLE UPDATE FLIGHT	0.0	39000000.	والمراقب	
27 * EXPERIMENT UPNATE	0.0	60000000	4	
28 * G.S.F.C. & OTHER			9000000	-
29 ORBITAL OPERATIONS		111137056		
G & A CHARGEABLE	84124048	[433615H.	1160999•	
G C A	10851997	125469200.		
SUSTOTAL	94976032.	194863680.		
NON-G & A SURTOTAL	109173040.	3203328000.	1 01 609994	
TOTAL			*******	
*NO G & A CHARGE		_TOTAL	439666688• 25999984•	
COST OF ADD'L SHUTTLE REPAIR	FLTS		465666560	
COAND TOTAL		and the second	The second secon	<del></del>
NO. OF FAILURES 11.20				

,		PERCOM PRO	GRAM	•		
		PROGRAM N	0.39			ı
		PHUGRAM N			The state of the s	
	and the state of t		<b>-</b> · ·			
SHUTTL	E SCHEDULE DELAY 6.0					
TOTAL	SYSTEM MYTF 12.0					
VAR5	URSYSTEM_SLOPE 1.25					
SHUTT	LE-MAINTAINED PROGRAM		OFCHORING	OPERATIONS		
(3 SP	ACECRAFTI-NOT OPTIMIZED	NON-RECURRING				
		20150000	30649216			
1	STRUCTURE	17500000.	2250126.	•		
, 2	PHGINEERING	770620.	20475984+			
	STABLE FATION	2120000.	2910971.			
4	THERMAL SHE MECHANISMS	3520000.	2721483.		3.7.4 %	
·	ELECTRIC POWER	365826.	9232755**		* / - *	<u> </u>
	PRIMARY OFFICS	3300000	13800009.			•
k	CONV. & DATA HANDLING	2125532.	29月3493			
9	PNEUMATICS	15370	2070634		<del></del>	
10	TEST & SUPPORT FOUIPMENT	4669540	7119000		/ <u>, </u>	
11	PROGRAM MANAGEMENT	2533000 944000.	2448698.		NO.	•
1 S	SYSTEM INTEGRATION .	111600	133B00+		REPRODUCIBLE	
17	RELIABILITY,	1445220.	5820000 ·		"EPA	
1 4	QUALITY ACCEPTANCE	582000	670000		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
15	TITAN INTERSTAGE	0.0	1000000.		UC.	
-	TITAN SHROUD SHUTTLE INTERFACES	20910000.	1997000.			
17	TRAINERS & SIMULATORS	3110400.	100000.		· · · · · · · · · · · · · · · · · · ·	
18	* EXPERIMENTS A G.B	5000000	39000000.	<u> </u>		
70		3251000+	800000 • 0 • 0			
21	* NEW COMPUTERS	4550000			•	
_	LAUNCH OPERATIONS	0.0	225000000			
	* LV-TITAN	0.0	100000000			
	* LV-SHUTTLE	0.0	4950000#			
24	SHC SUPPORT  * FACILITIES	1347012.	362826.			
25	* SHUTTLE UPDATE FLIGHT	0.0	150000004			
70 27	* EXPERIMENT UPDATE	0.0	39000000	Description of the second seco	to the same of the	_
2A	* G.S.F.C. & OTHER	0.0	0000000+			
,				9000000		
29	ORBITAL OPERATIONS	84124048.	111133056.	-	As he special to the state of t	<del></del>
	G & A CHARGEARLE	10851997.	14336158	1160999+		
	G & A	94976032.	125469200.			
	SUBTOTAL	14197012.	194963680.			
	NON-G & A SUBTOTAL	109173040.	320337800.	10160999.	va. — adventu — — — — — — — — — — — — — — — — — — —	
	TOTAL ************************************			439666688.		
			TOTAL .		The state of the s	
	COST OF ADDIL SHUTTLE REPAIR F	LYS		4563333124		
	GRAND TOTAL				*	
	NO. OF FAILURES. 9.33	-		•		
	UPTIME (YEARS) 9.33				• • • •	

		PEPCOM PR	OGRAM		
		PROGRAM	NO.35		
		breachigh drinks the All			
	1				
	LF SCHEDULE DELAY., 12.0		, , , , , , , , , , , , , , , , , , ,		
TOTAL	SYSTEM MTYF 12.0			•	
VAR+_	SUBSYSTEM_SURPE1.25				
* * * * * * * * * * * * * * * * *	**************************************	************		######################################	
2001 71 C	PACFCRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRENCE	OPERATIONS	
					•
1.	STRUCTURE	20150000.	30649216.		
, -	ENGINFERING	17500000.	2270126.	•	• •
3,	STABILIZATION	770620.	20475984.		<u> </u>
4	THERMAL	2120000.	2910971.		•
S	S-C MECHANISMS	3520000.	2721483	is gaining the large of a large description and other property and the second	25 0
6	ELECTRIC POWER	365926***	9232755.	- •	w ra
	* PRIMARY OFFICS	31000000			
	COMM. 6 DATA HANDLING	で125532。 15370。	2983443.	-	•
	PNEUMATICS TEST & SUPPORT FOUIPMENT	1537V+ 4569540+	20/0634		
10	PROGRAM MANAGEMENT		7119900.		,
	SYSTEM INTEGRATION	944000	2448674.	white was an about an an an average as becoming the constraint of	
• • • •	STATE INTERNATION	111600	133800.		
14		1445220.	5820000+		
• .	TITAN INTERSTAGE	SA2000	6/0000+		
	* TITAN SHROUD	0.0	1000000		
	SHUTTLE INTERFACES	20910000.			
	TRAINERS & SIMULATORS	3110400.	100000,		
1 9	* EXPEDIMENTS A & B	5000000	39000000		,
20		3251000.	800000		
21	* NEW COMPUTERS	4550000.	0.0		
	LAUNCH OPERATIONS				
	* LV-TITAN	0.0	225000000		
	* LV-SHUTTLE	0.0	10000000.		
24		0.0	4950000.		
		1347012	362826		
	* SHUTTLE UPDATE FLIGHT	0.0	15000000.		•
27	* EXPERIMENT UPDATE	0.0	39000000		
20 ~	* G.S.F.C. & OTHER	0.0	60000000		¥
<del></del>				900000.	
29	DRHITAL OPERATIONS	0 4 4 2 4 4 4	111177056-		
	G & A CHARGEABLE	#412404# 10851997.	14336158.	1160999.	
	G & A	94976032.	125469200.		
	SUBTOTAL NON-G & A SUBTOTAL	14197012.	194863680		
	TOTAL	109173040		10160999•	
	*NO G & A CHARGE		444-44-4		
			TOTAL	439666688	
	COST OF ADDIL SHUTTLE REPAIR FLTS			5000000.	
	GRAND TOTAL			444666684.	
	NO. OF FAILURES 7.00				•
	UPTIME (YCARS) 7.00				
	UPTIME RATIO 0.47	•	1000	•	

	a may printed on the superior continuents of the last of the superior of the s			t Namentojana, umpre ja – prei japo kontratoja erro –		<u> </u>
		PROGRAM N	10 • 36			
		ф и <del>піМа</del> пей — Е		<del>-</del> -	mer and to the many a present transfer	
	UTTLE SCHEDULE DELAY 24.0	entergrander) in one of the		-		نكد بي بايم د يو پايستان بيان و بيدي معنون
	FAL SYSTEM MITE 12.0					
VA	P. SURSYSTEM_SLOPE 1.25			و مواجع مي مدينه ميرمو ميرمو	فيستنا المتحدث فيستنيه والمتحدث بتدائي والمتحدث	
				•		
	**************************************		•••••••	***********		
-	HUTTLE-MAINTAINED PROGRAM 3 SPACECRACT)-NOT OPTIMIZED	NON-RECURRING	PECURATNG	OPERATIONS		
	1 STRUCTURE	20150000.	30649216.			
	2 ENGINTERING	17500000.	2250126.	•		•
	3 STABILIZATION	770620.	20475984		سيمين بالناب والكالة استجيب ميمانة وطيعه الرائد الموجد بهيدا مردر	
	4 THERMAL	2120000.	2910971.			
	S. S-C MECHANISMS	3520000.	2721481.	rame a la la financiamente d'Ar		
	S FLECTRIC POWER	365926.	4 92 32 765.	n <del>air</del>	•	* *-
	7 # POIMARY OFFICS	3 100000				
	G COMM. E DATA HANDLING	2125512.	1 4000008.	•	•	•
	9 PHEIMATICS	15370.	2083483	ph to proprocessor and the contract of the con		
1	O TEST & SUPPORT FOULPMENT	4669540.	2070634.	•	•	
!	1 PROGRAM MANAGEMENT	2533000.	71 [ 9000 •			<del></del>
1	SYSTEM INTEGRATION	111600.	133400.		•	•
!	T RCLIABILITY	1445220.	5820000	* ************************************	· · · · · · · · · · · · · · · · · · ·	,
	4 QUALITY ACCEPTANCE	582000.	670000			,
· }	5 TITAN INTERSTAGE	0.0				•
	7 SHUTTLE INTERFACES	20910000.				
	TRAINCRS & SIMULATORS	3110400.	100000.			
-	9 + EXPERIMENTS A & B	5000000.	39000000.			
	O GROUND STATION	3251000.	800000.			
	1 * NEW COMPUTERS	4550000.	0.0			
	LAUNCH OPERATIONS					
	P + LV-TITAN	0.0	225000000			
2	3 * LV-SHUTTLE	0.0	t0000000+			
2	4 S-C SUPPORT	0 • 0	4950000.			
	FACILITIES	1347012.	362826.			
-	6 * SHUTTLE UPDATE FLIGHT	0-0	15000000. 39000000.	•		
	7 * EXPERIMENT UPDATE					
2	A * G.S.F.C. & OTHER	0•0	60000000.	•		
	9 ORBITAL OPERATIONS			90000000		
2	G & CHARGEABLE	84124048.	111133056.	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		٠
	G G A	10851997.	14736158.	1160999.		
	SUBTOTAL	94976032.	125469200.			
	NON-G & A SURTOTAL	14197012.	194867680.			
	TOTAL	109173040.	320332800.	10160999		
	*NO G & A CHARGE					
		7	OTAL .	439666688.		
	COST OF ADDIL SHUTTLE REPAIR FLY		* _ = = = ==	0.0		
	GRAND TOTAL			439666688		
	NO. OF FAILURES 4.67					
	UPTIME (YEARS) 4.67					

•

		PROGRAM	NO.17		
·			MLS		
SHUT	TLE_SCHEOULE_DELAY 0.5				
	L SYSTEM MITE 15.0				
VAR•					<del></del>
			•		
CHI	JTTLE-MAINTAINED PROGRAM	********	• • • • • • • • • • • • • • • • • • • •	***************************************	
	SPACECRAFTI-NOT OPTIMIZED	NON-DECUEDING	DECHODING	OGCO ATTONE	
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1	STOUCTUPE	The state of the s		• • • • • • • • • • • • • • • • • • • •	•
<u>2</u> -	CNGINEFRING	17500000	2250126.		
" 3	STATILIZATION	*			•
4	THERMAL	2120000.	2910971.		·····
5	S-C MCCHANISMS	3520000.			- "
٠. ٠	ELECTRIC POWER	551829.	139271374		
7_	* POIMARY OPTICS	3300000.	B000878		
	COMM. E DATA HANDLING	3206258.	20816609.		
າ_	PNEUMATICS	23195.	4500433.		
10	TEST & SUPPORT EQUIPMENT	4569540.	2070634.		
11	PROGRAM MANAGEMENT	2533000	7119000	Nor	
12		944000.	2448699.	REPRODUCIBLE	•,
	RFLIABILITY	111600.		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	<del> </del>
14		1445220.	5820000.	ROS	
	TITAN INTERSTAGE				
	* TITAN SHPAUD	0.0	1000000.	\ \( \lambda \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
	SHUTTLE INTERFACES	20910000.			
	TRAINERS & SIMULATORS	3110400.	100000.		
	* EXPERIMENTS A G B	5000000	39000000.		
	GROUND STATION * NEW COMPUTERS	3251000. 4550000.	800000. 0.0		
	* KEN CONFICE	44300001			<del> </del>
	LAUNCH OPERATIONS				
22	* LV-TITAN	0.0	22500000.		
	* LV-SHUTTLE	7.0	10000000.		*
	S-C SUPPORT	0.0	4950000.		
-	* FACILITIES -	1747012.			
	* SHUTTLE UPDATE FLIGHT	0.0	15000000.		
	* EXPERIMENT UPDATE	0.0	39000000.		
	* G.S.F.C. & OTHER	_ 0.0	60000000.	-	
				•	
50_				, 9000000.	
	G & A CHARGGABLE	85790412.	134772000.		
	GEA	11066961.	17385568.	1160999.	
	SUBTOTAL	96857392.	152157568a		····
	NON-G & A SUBTRITAL	14197012.	194863680+	· · · · · · · · · · · · · · · · · · ·	
	TOTAL.	111054400.	347021056.	10160999•	
	*NO G & A CHARGE				•
			rotal	468236288.	
	COST OF ADDIL SHUTTLE REPAIR FL	TS		24193536.	
	GRAND TOTAL		***		
	NO. OF FAILUPES 10.84				

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	PROGRAM	NO.38			
				y managaman pagamanan ya managan panamanan da da	
And the W. Bel. G. D. Anderson Managering and the Angle and Strategy					
SHUTTLE SCHEDULE DELAY 1.0	ph 10 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1			·	•
TOTAL SYSTEM MITT 15.0					
VAR. SUBSYSTEM SUMPE 1.25					
		• • • • • • • • • • • • • • • • • • • •	************	name along Galdyl III along P galacted Charles	
SHUTTLE-MAINTAINED PROGRAM	non accumutate	RECURNING	OPERATIONS		
(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING				
	20150000	30649216.		·	
1 STRUCTURE	17500000	2250124.			•
2 ENGINFERING	1162441	30896976		1	
3 STABILIZATION	2120000	2910971.			
4 THERMAL	3520000	2721483.			<del></del>
5 S-C MECHANISMS	551929•	13927137.		,	All To service
T * PRIMARY OPTICS	3300000.	8000878.			
	3206258.	20414604			
B COMM. 6 DATA HANDLING	23185	45004 13+			
9 PNEUMATICS 10 TEST & SUPPORT EQUIPMENT	4669540	20 706 34 •			
• •	2533000.	7119000.			
PPOGRAM VANAGEMENT	944000	2448698.			•
12 SYSTEM INTEGRATION	111600.	t 53800°+			
13 RELIABILITY 14 QUALITY ACCEPTANCE	1445220.	5820000	4		_
	582000	670000+			
15 TITAN INTERSTAGE	0.0	1000000			
16 * TITAN SHROUD	20910000.	1997000+			
17 SHUTTLE INTERFACES TRAINERS & SIMULATORS	3110400.	100000.			
10 * EXPEDIMENTS A & B	5000000	39000000			
20 GROUND STATION	3251000.	800000	4		
	4550000.	0.0			
21 + NEW COMPUTERS					
LAUNCH OPERATIONS					
22 * LV-TITAN	0.0	22500000.	•	,	
23 * LV-SHUTTLE		10000000			
S-C SUPPORT	0.0	4950000+		./ ,	
25 * FACILITIES	1347012•	362826		<del> / /</del>	44
24 * SHUTTLE UPDATE FLIGHT	0.0	15000000.		,'	<b>₹</b>
27 * EXPERIMENT UPDATE		390000000		<del></del>	
28 * G.S.F.C. & OTHER	0.0	60000000.	`	· · · · · · · · · · · · · · · · · · ·	
*			9000000.	<del>-,</del>	
20 ORBITAL OPERATIONS	06700439	134772000-	/		
G & A CHARGFABLE	85790432	17185568	1160999		
G & A	11066961.	152157568.	1		
SUBTOTAL	96957392+ <u></u> 14197012+	194863680			·
NON-G & A SUBTOTAL		347021056.	101409999•		
TOTAL	111054400-				
*NO G & A CHARGE		TOTAL.	468236288.		
	· -		22500000		•
COST OF ADD'L SHUTTLE REPAIR FLTS			490736128.		
GRAND TOTAL					
NO. DE FAILURES 10.50			•		
UPTIME (YEARS) 13-12			,		

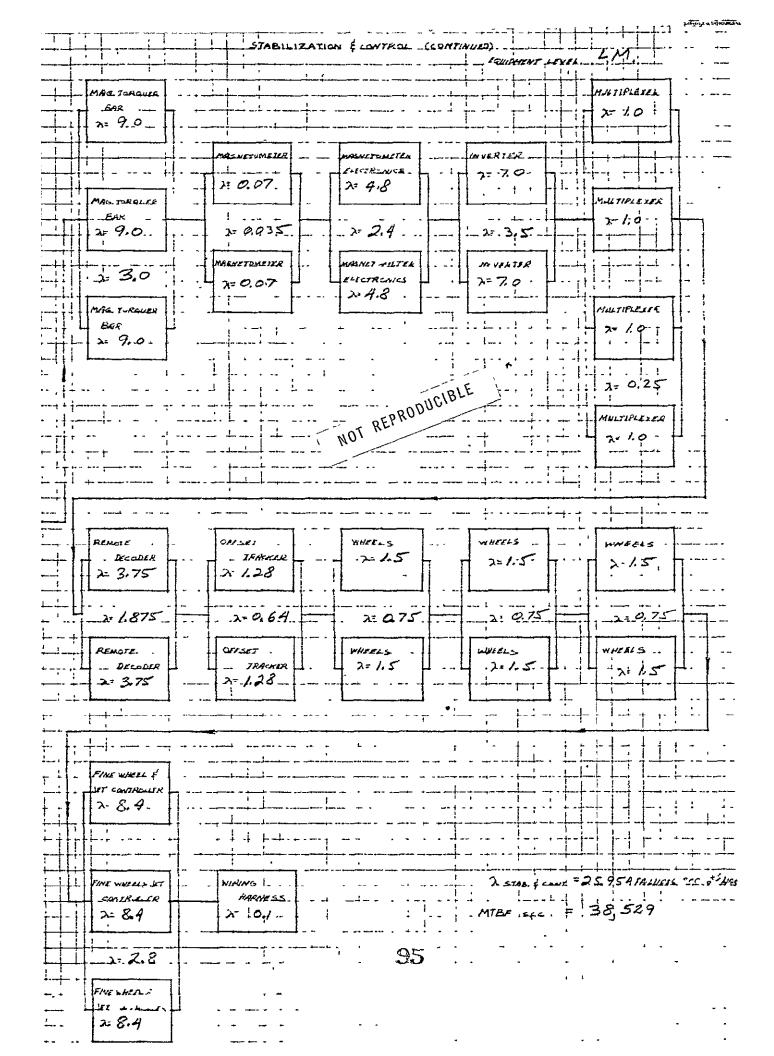
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	THE GROUP LEVEL FAILURE RATE ANALYSIS
GROUP.A:	GROUP LEVEL FAILURE RATE ANALYSIS
STABILIZATION  F CONTROL  2=191	PNEUMATICS THERMAL COMMUNICATION FOWER STRUCTURE
	* 2 AMERICA = VOTSO.
10,A 0	
STABILIZATION	PNEUMATICS THERMAL COMMUNICATION HOWER STRUCTURE
\$ contract	$\frac{1}{2} = 0.385$ $\frac{1}{2} = 0.06$
	M7BF 0A0 = 612 70 MPS
M	
STABILIZATION  £ CONTROL $\lambda = A.2/4$	Prejunatics Thermal communication Power STRUETURE $\lambda = 6./33 \qquad \lambda = 0.05 \qquad \lambda = 19.75 \qquad \lambda = 0.95 \qquad \lambda = 0.01$
	MTBF M = 37,197 MPS
NOTE ALL DASE IN FAILURE	5 PER 10 5 1/8 \$

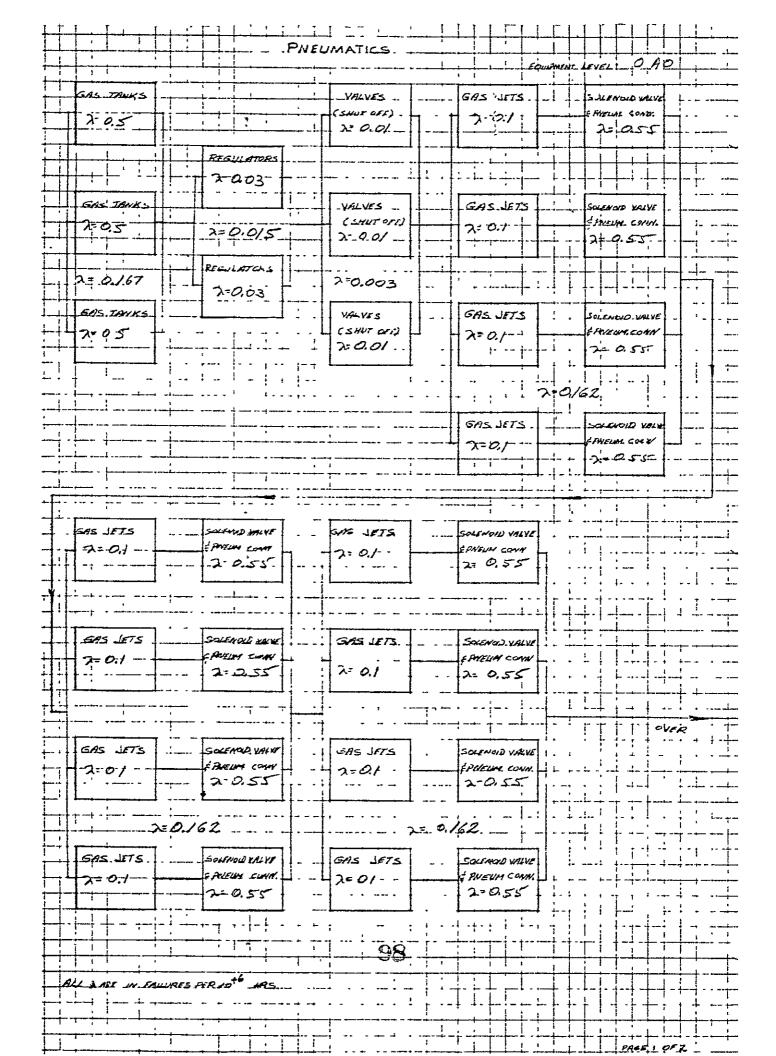
STAB	ILIZATION É CONTROL
	EQUIPMENT LEVEL, ALREPERT
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35N3OR	22 0.29
<del>                                      </del>	
DISTAL SUN	DISTAL SUA
SENSOR	SENSOR BLEET
	- 1 × 0.39
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	DIGITAL SUN SENSOR SLEET  AL OL 29
	-t
DISITAL SUN	DISITAL SUV
SFNSOR	SCASSON FLECT
2:01	- 2: 0.39
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<del>┍</del> ╋╫	
	<del></del>
DIGITAL SUN	DIGITAL SUN
SENSOR 1 2-0-1	SINSORPLECT
TRACHER	
1 2015	2- P.25 1 1 0.75
A. Q. 88 SOLAR ASPECT	20/25 22375 000
FIXED HERD	
FIRED HEAD 2= P2/	12= 0.078. WALT UNIT ELECT
2-15	2 0.25 LONG 2-0.75
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SOLAR ASPECT	SCIER REPECT
SENSOR	SENSOR ELSCT.
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SOLAR ASPECT	. SOLAR ASPECT
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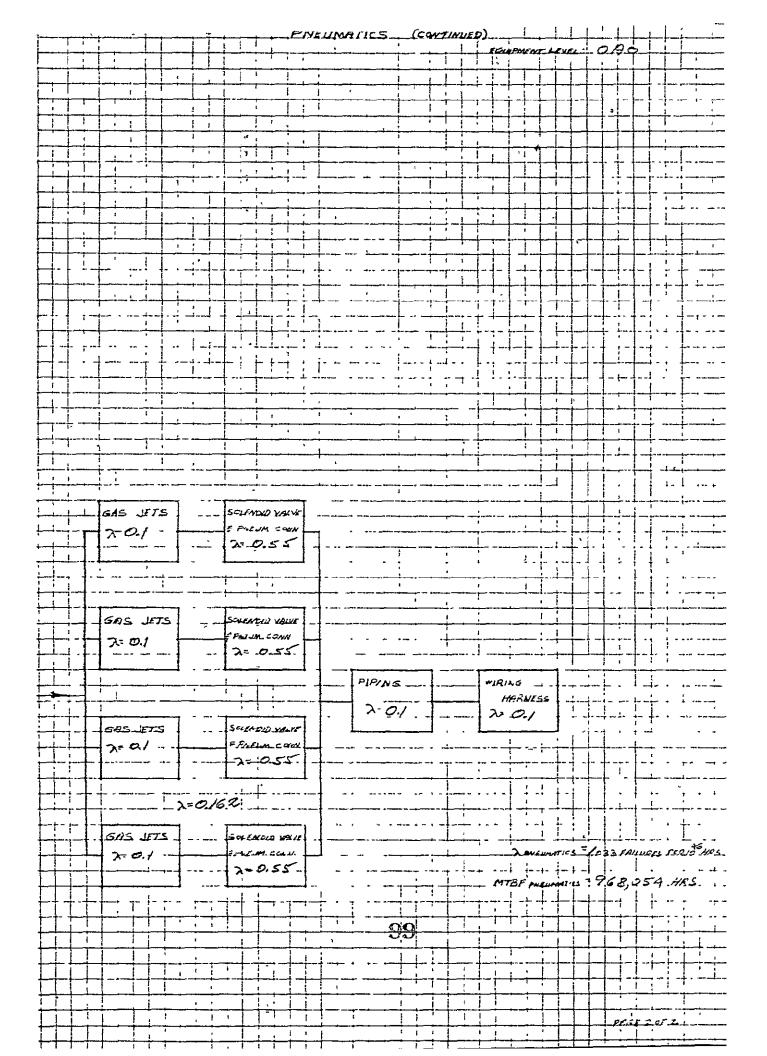
STABILIZATI	ON É CONTROL (CONTINUAD)
	FRUINTENT LEVEL B'REPART
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7=00005	<del>┈╶``</del>
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J. 0.00/	27 0.39
MAS. TORQUER	MALTIPLEXER
LILLER LILLE	1
2=0.02005 1= 0.0005	λ= 0./97     λ=.015
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MAGNETOMETER	MASS NET ARETER
7=20002   x=0.001	LECECTRONICS H. H X= 1.0 + H - H - H - H - H - H - H - H - H - H
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2.0.0005	
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	MULTIPLEXER
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BENETE GESSEL	WHEELS WHEELS WHEELS
DECEMBER TRANSPORT	7=0.006 7 7 -2=0.006 7 7 2-0.006 7
2-A.O. DE 0.02	7=0.006 7 - 7 - 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7 2=0.006 7 - 7
DECENTED TRANSPORT	7=0.006 7 7 -2=0.006 7 7 2-0.006 7
2= A.0 2= 0.02	2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006
2- A.0 2- 0.02  2- 0.01  REMOTE CHESET	2=0.006 \ \( \tau = 0.006 \) \\\\ \( \tau = 0.006 \) \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
REMOTE TRACER  TRACE	2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006
2- A.0 2- 0.02  2- 0.01  REMOTE CHESET	2=0.006 \\ \tau = 0.006 \\ \tau = 0.0006 \\ \t
REMOTE TRACER  TRACE	2=0.006 \\ \tau = 0.006 \\ \tau = 0.0006 \\ \t
REMOTE CIESES TRANSPORTED TO THE DESCRIPTION OF THE	2=0.006 \\ \tau = 0.006 \\ \tau = 0.0006 \\ \t
REMOTE STRACTER  DELOCATE STRACTER  TRACTER  TRA	2=0.006 \\ \tau = 0.006 \\ \tau = 0.0006 \\ \t
REMOTE CELLET TRACKER  DELOCATE TRACKER  DELOCAT	2=0.006 \\ \tau = 0.006 \\ \tau = 0.0006 \\ \t
RECORD TRACKED  2- A.O	2=0.006 \\ \tau = 0.006 \\ \tau = 0.0006 \\ \t
PECCOER TRANCE  2-A.9 2-0.02  2-0.01  REMOTE TRACKER  2-A 0 2-0.02	2=0.006
RECORD TRACKED  2- A.O	2=0.006
RECODER  TRACKER  2- A.9  2- O.02  REMOTE  DESCRIET  TRACKER  2- A O  TO DO  TO	2=0.006
PECCOER TRANCE  2-A.9 2-0.02  2-0.01  REMOTE TRACKER  2-A 0 2-0.02	2=0.006
REMOTE  DESCRIPTION  REMOTE  DESCRIPTION  DE	2=0.006
PECCOER  JE A.O  ZE O.O2  REMOTE  DESCRET  TRACKER  JE O.O2  FINE WHELF  WIT SONTROWER  ZE O.O33  INVING	2=0.006 \ \( \times = 0.006 \)
FINE WHELF LT  FINE WHELF  FINE WHELF LT  FINE WHELF LT  FINE WHELF LT  FINE WHELF  FINE W	2=0.006 2=0.006 2=0.006 2=0.006 2=0.003 2=0.003 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.006 2=0.00
PECCOER  JE A.O  ZE O.O2  REMOTE  DESCRET  TRACKER  JE O.O2  FINE WHELF  WIT SONTROWER  ZE O.O33  INVING	2=0.006   2=0.006   2=0.006   2=0.006   2=0.003   2=0.003   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.006   2=0.00
FINE WHELF LT  SINE WHELF LT  COTAL ARR  TOTAL ARR  TOT	2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0
PECCOER  DESCRIPTION  REMOTE  DESCRIPTION  PRACTE  TRACTE  TRA	2=0.006
FINE WHELF LT  SINE WHELF LT  COTAL ARR  TOTAL ARR  TOT	2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0
FINE WHELF	2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0.006  2=0
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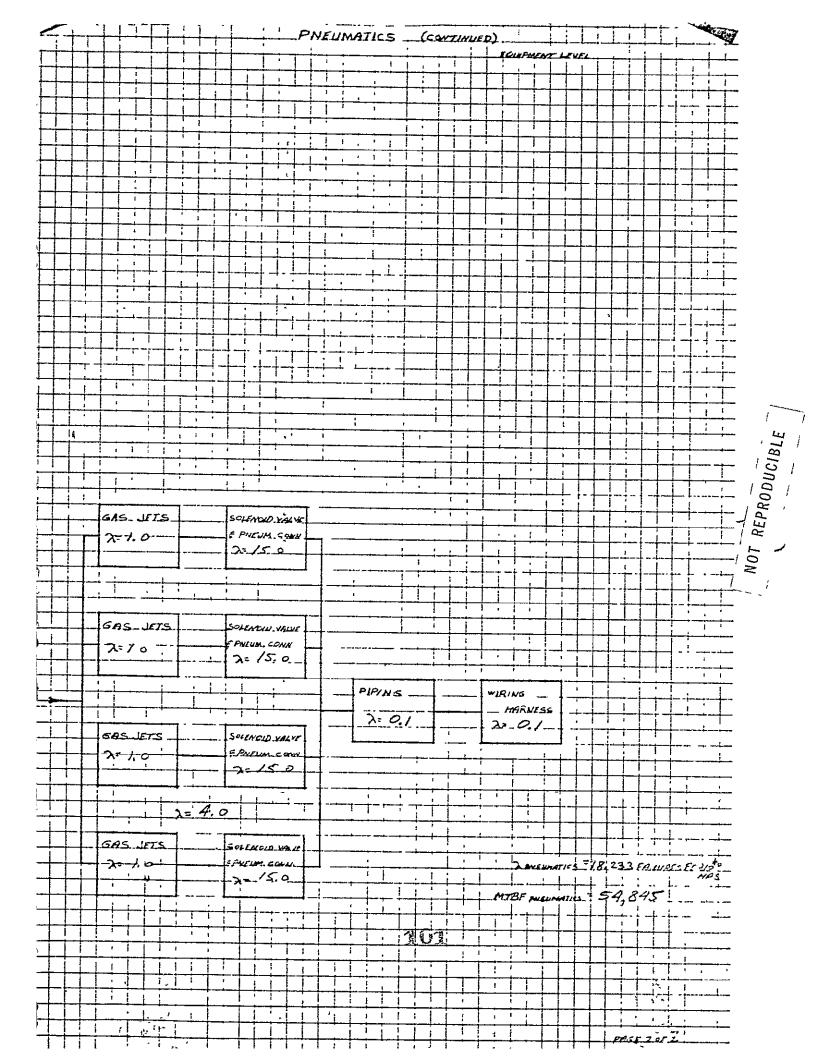


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	17 SYSTEM INTEGRATION	944000	2448699	and the second section of the second section of the second section sec	
ì	13 PELIABILITY	111600.	1 11000.	• •	•
	14 QUALITY ACCEPTANCE	1445220.	5820000		
	15 TITAN INTERSTAGE	582000.			
	16 * TITAN SHROUD	0.0	1000000		•
	17 SHUTTLE INTERFACES	20910000.			
	18 TRAINERS & STHULATORS	3110400.	100000.		
	19 # EXPERIMENTS A & B	5000000.	39000000		
	20 GROUND STATION	3251000+	800000		
	21 * NEW COMPUTERS	4550000.	0.0		
	(AUME) ADEDITIONS				
	LAUNCH OPERATIONS	0.0	22500000.		
	=	9.0	1000000		
	23 * LV-SHUTTLE	0.0	4950000		
	75 * FACILITIES	1347012.	362826.		
	26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.		
	27 * EXPERIMENT UPDATE	0.0	39000000	•	
	28 * G.S.F.C. & DTHFR	0.0	60000000.		
	ACCULATION CONTRACTOR			9000000	
	29 ORBITAL OPERATIONS G & A CHARGEABLE	85790432•	134772000.	7000004	
	G C A	11066961.	17385568.	1160999.	**************************************
	SUBTOTAL	96857392	152157568.	F F AA A A 4 &	
	NON-G & A SUBTOTAL	14197012+	194863680.		
	TOTAL	111054400.	347021056.	101609994	
	*NO G & A CHARGE				
	The second second	•	TOTAL	<b>469236288</b>	
	COST OF ADDIL SHUTTLE REPAIR FLY			20909088.	
	GRANO TOTAL			489145344*	
	NO. OF FAILURES 10.18		- 44		
	NIIA UP PAIGURESAAAA IUAIO				

PERCOM PROGRAM PROGRAM NO.40 SHUTTLE SCHEDULF DELAY. . 2.0 TOTAL SYSTEM MITTERS 15.0 VAR. SUBSYSTEM SLOPE.... 1.25 SHUTTLE-MAINTAINED PROGRAM NON-RECURRING (3 SPACECRAFT)-NOT OPTIMIZED 175000000 2250126. ENGINEERING 30886976. 1162441. STABILIZATION 2120000. 2910971. THEOMAL 3520000. 2721493. S-C MECHANISMS. FLECTRIC POWER 551829. 13927137. 8900878. -00000EF * PRIMARY OPTICS COMM. & DATA HANDLING 3206258. 20816698. 23185. 4500433. PNEUMATICS TEST & SUPPRIST EQUIPMENT 4669540. 2070634. 2573000. PROGRAM MANAGEMENT SYSTEM INTEGRATION 944000. 2448098. 133800. 111600. RELIABILITY 1445220. QUALITY ACCEPTANCE IS___ TITAN INTERSTAGE 582000. 670000. 0.0 10000000. 16 # TITAN SHROUD 1997000. 209100000. SHUTTLE INTERFACES 3110400. 100000. TRAINCRS & SIMULATORS 5000000. 390000000 10 * EXPERIMENTS A & B 20 GROUND STATION 3251000. 8000000 45500000. 21 * NEW COMPUTERS LAUNCH OPERATIONS 225000000 LV-TITAN 100000000 LV-SHUTTLE 49500004 S~C SUPPORT 3628264 1347012. FACILITIES 26 * SHUTTLE UPDATE FLIGHT 15000000. 0.0 39000000 27 * EXPERIMENT UPDATE 0.0 28 * G.S.F.C. & OTHER 600000000 9000000 ORMITAL OPERATIONS 134772060. 85790432. G & A CHARGEABLE 11066961. GEA 152157568. 96857392. SUBTOTAL 14197012. 194863680. NON-G & A SUBTOTAL 10160999 347021056. 111054400. WNO G & A CHARGE . 468236298. 19411760. COST OF ADDIL SHUTTLE REPAIR FLTS 487648000 GRAND TOTAL NO. OF FAILURES.... 9.88 UPTIME (YEARS).... 12.35 UPTIME RATIO.....

دور به ما دور	PROGRAM N		property with the constitution of the same	
•	ramann i		مستوسد سدادا ما مدا المداد	
SHUTTLE SCHEDULE DELAY++ .2+5				
TOTAL SYSTEM METE 15.0 VarSubsystem_slode1.25			a description that the second	
A Wise ************************************				
	4		**************************************	
SHUTTLE-MAINTAINED PROGRAM		actuan tua	COEDATIONS	
(3 SPACECPAFT)-NOT OPTIMIZED	NUN-RECURRING	RECURRING	VFURE(#UHD	<u> </u>
••••••••••••••••••••••••••••••••••••••	20150000	*30649216		
1 STRUCTURE S ENGINEERING	17500000	2250126.		•
3 STABILIZATION	1169661	30886976.	· · · · · · · · · · · · · · · · · · ·	·
4 THEOMAL	2120000.	2010971.		
5 S-G MECHANISMS	3520000+	AT THE PARTY OF TH	# ************************************	<u> </u>
6 ELECTRIC POWER	551829.	13927137.		
7 # PRIMARY OPTICS				
A COMM. E DATA HANDLING	3206256+	20816608.	r.	•
9 PHENMATICS	23185•	****		
10 TEST & SUPPORT FOULPMENT	4669540.	2070634.	and the second s	
11 PROGRAM MANAGEMENT		7119900		
12 SYSTEM INTEGRATION	944000.	133800.		
IT RELIABILITY	1445220.	5820000		· • · · · · ·
14 QUALITY ACCEPTANCE 15 TITAN INTERSTAGE	582000			
16 • TITAN SHROUD	0.0	1000000.		
17 SHUTTLE INTERFACES	\$0910000 •	1997000		
18 TRAINERS & SIMULATORS	3110400.	100000		
19 * EXPERIMENTS A 6 B	5000000.			
20 GPOUND STATION	3251000.	H00000.		
21_ * NEW COMPUTERS	4550000.	0+0		
LAUNCH OPERATIONS	0.0	225000000		<u>, , , , , , , , , , , , , , , , , , , </u>
22 * LV-TITAN	0.0	10000000		
23 * LV-SHUTTLE	0.0	4950000		
25_ * _ FACILITIES	1347012			
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.		•
27 * EXPERIMENT UPDATE	0.0	39000000.		
28 * G.S.F.C. & OTHER	0.0	60000000.	•	
			200000	
29 DRBITAL OPERATIONS			9000000	
G & A CHARGEABLE		134772000	1160999•	· · · · · · · · · · · · · · · · · · ·
G & A	11066961	17 /85568• 152157568•	11110777#	
SUSTITAL	96857392. 14197012.	194863680.		
NON-G & A SUBTOTAL	111054400.	_	10160999•	
TOTAL *NO G & A CHARGE	, x 1 4 0 13 4 10 0 0 0			
THE G & A CHARGE		TOTAL	468236288.	
COST OF ADD'L SHUTTLE REPAIR FL			1799984.	
GRAND TOTAL			486236160.	
NO. OF FAILURES 9.60				

UPTIME PATIO..... 0.67

			The second secon	
	PROGRAM N	0.44		
•		* 44 pre 1870 y		
A A W Marry on Salary States Street, or Spinster, Spinst				d 44 g - 1 d 4 d 5 d 5 d 5 d 5 d 5 d 5 d 5 d 5 d 5
SHUTTLE SCHEDULE DELAY. 17.0		A 4 - A A 3 - A 3 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4 - A 4		
TOTAL SYSTEM MITT 15.0				
VAR. SUNSYSTEM SLOPE 1.25				
SHUTTLE-MAINTAINED PROGRAM			OPERATIONS	
(3 SPACECPART)-NOT OPTIMIZED	NON-RECURRING _	RECURRING	UPPRATIONS.	
		7044004	************	
STRUCTURE	20150000.	2250126*		•
PENGLACERING	17500000	20006076	•	
3 STABLIZATION	1162441.	2010971	man a year of form permanental	
4 THERMAL	2120000.	2721483.		
5 S-C MCCHANISMS	3520000.	1392/137.		. * * *
A ELECTRIC DUMER	551829.			
7 # PRIMARY OPTICS	3300000	20816608+		
8 COMM. & DATA HANDLING	21185	4500433.		
9 PNEUMATICS	4669540.	2070634.		
10 TEST & SUPPORT EQUIPMENT	2573000	7119000.		
11 PROGRAM MANAGEMENT	944000.	2449699.	•	•
12 SYSTEM INTEGRATION	111600.	133000		
17 RELIABILITY	1445220.	5820000.	•	•
14 QUALITY ACCEPTANCE	582000.	670000.		
15 TITAN INTERSTAGE	0.0	1000000	·	
16 # (114N SPROUP)	20910000.	1997000.	AND THE REAL PROPERTY AND THE PROPERTY A	
17 SHUTTLE INTERFACES TRAINERS & SIMULATORS	3110400.	100000+		
to # EXPEDIALNES & STUDENTONS	5000000-	39000000.		
20 GROUND STATION	3251000.	n00000•		
PL * NEW COMPUTERS	4550000.		and the second s	
LAUNCH OPERATIONS		22500000.		
22 + (V-T!TAN	0.0			
23 * LV-SHUTTLE		4950000		
24 S-C SUPPORT	0.0	362826		
25 * FACILITIES	1747012	15000000.	- Andrew Control of the Control of t	
26 * SHUTTLE UPDATE FLIGHT	0.0	39999999	3	-
27 * FXPERIMENT UPDATE	0.0	60200000		•
28 * G.S.F.C. & OTHER	010	<del>-</del> <del>-</del> -		
			9000000.	•
29 ORBITAL OPERATIONS	85790432.	134772000.		
G & A CHARGFABLE	11066061.	17385568	1160999•	•
G & A	96857392+	152157568•		
SUBTOTAL NON-G & A SUBTOTAL	14197012.	194863680.		
	111054400.	347021056	10160999•	
TOTAL #ND G & A CHARGE		<del></del>		
		TOTAL	468236288.	
COST OF ADD'L SHUTTLE REPAIR	FLTS		0.0	
GRAND TOTAL			468236288.	
NO. OF FAILURES 6.22				
HOTTHE (YEARS) 7.78				
UPTIME RATIO 0.52		* i *		

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	PROGRAM	NO.45		
The state of the s		40 March (1/2) and annua		
		- A - A - A - A - A - A - A - A - A - A		
TOTAL SYSTEM MTTE 15.0			معاديرية <u>والمنظم والمنظم والمنظم</u>	
VAR. SUBSYSTEM_SLOPE 1+25		- mareath 7		
	• • • • • • • • • • • • • • •			
SHUTTLE-MAINTAINED PROGRAM	MON-RECURRING	RECURRING	OPERATIONS	
(3 SPACECRAFT)-NOT DOTIMITED			*******	
******************************	20150000	30649216+		
1 STRIJCTURE	17500000	2250126-		•
PENGINIFRING	1162441+	30996976	to a fine the state of the stat	
3 STABILITATION	2120000.	2910971+		
4 THERMAL	3520000	2721493	arrathere a series and an end to the series arranged arranged and the series are series and the series are series are series and the series are	
S-C MECHANISMS	5518294	139271374	•	3
A BOLLARY OBTICE	3300000	8000878+	And the state of the second se	
7 # PRIMARY OPTICS.  8 COMM. 6 DATA HANDLING	3206258+	20816608.		
	23185.	4500413	n dire is at the printer every is to quipture yet the grown the payment the printer of the print	
COMMONE SOULDMENT	4669540.	20/05/14	·	
	2533000	7119000+		
	944000	. P448699•	•	
	111600	1 13400	1	
The same of the sa	1445220.	5R20000.	i .	
	582000.	670000.	NOT REPRODUCIBL	•
15 TITAN INTERSTAGE	0.0	1000000	RED.	
17 SHUTTLE INTERFACES	20910000	1997090		
TRAINERS & SIMULATORS	3110400+	100000• 39000000•	OUC/A,	<del></del>
19 . EXPERTMENTS A & B	5000000	800000	-01	E
20 GROUND STATION	3251000•	0.0		
21 * NEW COMPUTERS	4550000		part at production and the second sec	~
LAUNCH OPERATIONS				
	0.0	225000004		
22 # LV-TITAN 23 # LV-SHUTTLE	0.0	10000000-	A LANGE OF THE PARTY OF THE PAR	
	0.0	4950000		
	1347012.	362826		
29 * FACILITIES 26 * SHUTTLE UPDATE FLIGHT	0.0	15000000		
27 * EXPERIMENT UPDATE	0.0	39000000		-
28 + G.S.F.C. & OTHER	0.0	60000000		
	<del></del>		9000000	
29 ORBITAL OPERATIONS		134772000.		
G & A CHARGEABLE	85790432.	17385568.	1160999•	
G & A	11066961	152157568+		
SUSTOTAL	96857392	194863680.	Uct-Marty M	
NON-G & A SUBTOTAL	14197012.	347021056	10160999	
	111054400	4878 C 188 B 37 V W V pagements		
NO G & A CHARGE		TOTAL	468236298	
COST OF ADOIL SHUTTLE REPAIR FI	TS		0.0	
	<b>→ ·</b> · ·		46823629B•	
GRAND TOTAL NO. OF FAILURES 4.31				

		PROGRAM	10.46		
			1 = 4 mm +		a wait a class or a dra state we said to have \$1 to \$100 and \$100
SHUT	TTLE SCHEDULE DELAY 0.5				
	AL SYSTEM MTTF 18.0				
van.	SURSYSTEM_SLOPE1.25				
			• • • • • • • • • • • • • • • • • • • •		
	JTTLE-MAINTAINED PROGRAM SPACECRAFT)-NOT OPTIMIZED	NON-DECLIDEING	RECURRENG	OPERATIONS	
	STRUCTURE	20150000.	30649216.		
	ENGINEERING	17500000	2250126.		
.3	STABILIZATION	1618100.	42994209.		
4	THERMAL	2120000.	2910971.		
5	S-C MECHANISMS	3520000.			
6	ELECTRIC POWER	768138.	19386 152.		
	. PRIMARY OPTICS	3300000.	8000878.		
4	COMM. E DATA HANDLING	4463058 <b>.</b> 1 3227 <b>3.</b>	28976384. 6264530.		•
,"	PNEUMATICS TEST & SUPPORT ENVIPMENT	4669540.	2070614.		,
	PROGRAM MANAGEMENT	2533000.	7119000.		•
12	SYSTEM INTEGRATION	944000.	2448699.		
13.	***************************************	111600	133800.		
	QUALITY ACCEPTANCE	1445220.	5420000.	•	
15	TITAN INTERSTAGE	SAPOOO. ,	670000.		
	* TITAN SHROUD	0.0	1000000.	·	
, 17_	SHUTTLE INTERFACES	20910000.	1997000.		
19		3110400.	100000.		
	• EXPEDIMENTS A B B	5000000. 3251000.	39000000. 		
	GROUND STATION  • NEW COMPUTERS	4550000	0.0		
· · · · · ·	The state of the s				4
	LAUNCH OPERATIONS				
22	+ LV-TSTAN	0.0	22500000.		
	+ LV-SHUTTLF	0.0	10000000.		
24	S-C SUPPORT	0.0	4950000.		
25_	* *FACILITIES- : A	<u>. •                                   </u>			<u>,</u>
	* SHUTTLE UPDATE FLIGHT	0.0	15000000.		
	* EXPERIMENT UPDATE	0-0	390000000		
29	# G.S.F.C. & OTHER	0.0	60000000.	•	
	DRATTAL OPERATIONS		<del></del>	9000000	
29		87728288.	162262 120.	•	
	G & A CHANGEANER	11316944.	20931824.	1160999.	
	SUBTOTAL	99045212.	183194144.		
	NON-G & A SUBTOTAL	14197012.	194867680.		
	TOTAL	113242240	378057729.	10160999•	
	*NO G & A CHARGE				
			TOTAL		ay other has need an annual contractive designation of the second and the second secon
	COST OF ADDIL SHUTTLE REPAIR FL	. <b>T</b> S		15405402.	
<b>.</b>	GRAND TOTAL			516866048	
	"NO. OF FAILURES 9.08				

are the set of the management and the set of	PROGRAM	NO.47		
	man qualificación de la faction de la factio	ger and to in terretorie ter		
MUTTLE SCHEDULE DELAY 1.0 OTAL SYSTEM METE 18.0			9 44 50 W	
And a first of the second of a first of a fi			•	
			**********	
SHUTTLE-MAINTAINED PROGRAM			aarn Ly ( AME	
(3 SPACECPART) -NOT DETIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
1 STRUCTURE	20150000	30649216		
2 ENGINERING	17500000.	2250126.		•
	1618180.	42994209		
4 THERMAL	2120000.	2910971.		
5 5-C MECHANISMS***	3520000	2721441.	and the second of the second o	
6 FLECTRIC POWER	768138.	19384 352%	ide on on of	e many comment of the a
7 + PREMARY SPEECS	3300000	8000478		
R COMM. & DATA HANDLING	4463098*	28976394+		
O PNEUMATICS	32273.			
10 TEST & SUPPORT EQUIPMENT	4667540.	2070634	•	
11 PROGRAM MANAGEMENT	25330000	71 19000+		
12 SYSTEM INTEGRATION	944000.	2444494		•
13 OFLIABILITY	111600+	131800+ 5020000+		
14 QUALITY ACCEPTANCE	1445220. 582000.	670000		•
15_ TITAN INTERSTAGE	0.0	1000000		
16 * TITAN SHROUD	20910000	1997000		
TRAINERS & SEMULATORS	3110400.	100000		
10 * EXPERIMENTS A & B	5000000.	39000000	· / //	
20 GROUND STAFEON	3251000.	800000.	Nox	•
21 * NEW COMPUTERS	4550000.	0.0		· · · · · · · · · · · · · · · · · · ·
*****			•	FPRODUCIBLE.
LAUNCH OPERATIONS				10p
22 * LY-TSTAN	0.0	275000000	•	Wr.
23 * LV-SHUTTLF		10000000-		VB/
PA S-C SURPORT	0.0	4950000.		\ <i>\</i> { <i>E</i>
25 * FACILITIES .	1347012	162 N 26 ·		
26 * SHUTTLE UPDATE FLIGHT	<b>0.</b> 0	39900000	-	<b>\</b> •
27 * EXPERIMENT UPDATE	0.0	600000000		
28 * G.S.F.C. & OTHER	<b>0 • 0</b>	(/U./ (/// (// / / / / / / / / / / / / / /		<b></b>
29 ORBITAL OPERATIONS	<del></del>		9000000.	
G & A CHAPGEABLE	87728288	162262320.		
G E A	11316944.	20931824	1160999.	
SUBTOTAL	99045232	187194144		
NON-G & A SURTOTAL	14197012.	194963680.		
TOTAL	113242240.	378057728	1 01 60 999	
*NO G & A CHARGE				•
مه در خر کا دری و پر میانامسیو در مسیدانسید	, <u>, , , , , , , , , , , , , , , , , , </u>	TOTAL	501460736.	
COST OF ADDIL SHUTTLE REPAIR FL	TS		14210524+	
GRAND TOTAL			515671040.	<u> </u>
NO. OF FAILURES 8.84			•	

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2000	n	A 44	AIC	_ A D

	tab esternel taa 💮 🕶 🛊			ب بن محمد بالاقتسام معمومه و معربت بين	
SHUTTLE SCHOOLE DELAY 1.5				the of prime 4 and the second section of the second	
TOTAL SYSTEM MITE 18.0	+				
_VARSURSYSTEM_SLOPE 1.25		4			
				No.	
SHUTTLE-MAINTAINED PROGRAM	•;•••••	••••			
(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS		
	****		***********	<u> </u>	
1 STRUCTURE	20150000.				~- <del></del>
S ENGINEEPING	17500000.	2250126.	•	· · · · · · · · · · · · · · · · · · ·	
3 STABILITATION	1610100.	42994208.			·
4 THERMAL	2120000.	2910971.			,
5 . S-C MECHANISMS	3520000•	27/1481.			
A ELECTRIC POWER & * "	768138 •	<b>1938€352•</b>	, , .	, s	•
7 * PPIMARY OPTICS	3100000.	8000878•	na delimentario e e e e e e e e e e e e e e e e e e e		
A COMM. 6 DATA HANDLING	4463058.	28976 484.		•	
9 PHEUMATICS	32273.	6264510.			
10 TEST & SUPPORT FOUTPMENT	4669540•	2070634.			
11 PROGRAM MANAGEMENT	2533000.	7119000.			_:
12 SYSTEM INTEGRATION	944000	2449698•	•		• -
13 RELIABILITY	111600,	133900			
14 QUALITY ACCEPTANCE	1445220.	5820000.		•	
15, TITAN INTERSTAGE	582000	670000			<del></del>
16 • TITAN SHROUD	0.0	1.000000.		_	
17 SHUTTLE INTERFACES	20910000.	1997090			<del></del>
IB TRAINERS & SIMULATORS	3110400.	39000000			
19 • EXPERIMENTS A C B	5000000 _*	nonono.			
20 GROUND STATION	3251000. 4550000.	0.0			
21 * NEW COMPUTERS	47-30000s		AND RESERVE THE PROPERTY AND RESERVE AND R		
LAUNCH OPERATIONS					
22 * LV-TTTAN	0.0	22500000.	the contraction of management of the contraction of		
23 * LV-SHUTTLF	0.0	10000000.			
24 S-C SUPPORT	0.0	4950000+			
25 * FACILITIES	1347012.	362726			
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.		•	
27 * EXPERIMENT UPDATE	0.0	39000000			
78 * G.S.F.C. & OTHER	0.0	60000000		4 4	
			000000	· · · · · · · · · · · · · · · · · · ·	
29 OPBITAL OPERATIONS			9000000.	•	·
G & A CHARGEABLE	8772828A	162262320•	1160999.		<del></del>
G & A	11716944.	20931824.	11 UAAA.		
SUDTOTAL	99045232.	183194144.			
NON-G & A SUBTOTAL	14197012.	194863680.	1.01.60000		
TOTAL	113242240.	378057729.	10160999•		
*NO G & A CHARGE		TOTAL	501460736.		
		_TOTAL	1 1076920	***	
COST OF ADD'L SHUTTLE REPAIR FLTS		•	51 45 374 72 4	*	
GRAND TOTAL					
NO. OF FAILURES 8.62 UPTIME (YCARS) 17.92			•		
UPIIME LYLANDIAAAAA 17476					

\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$	PROGRAM N	0.49		•
			بنية الشكوب ووكلك للناوي ووجود بالمنكرين بهر المناوي والمناوية	
HUTTLE_SCHEDULE DELAY				
OTAL SYSTEM MITE 18.0				
VAR . SURSYSTEM SLOPE				,
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
SHUTTLE-MAINTAINED PROGRAM				
SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING .	RECURRING	OPERATIONS	
			**********	
_ 1STRUCTURE	20150000.			
2 FNGINFERING	17500000.	2250125* 42994208*	,	
3 STABILIZATION	1618100.	2910971		
4 THERMAL	2120000			1
5 S-C MECHANISMS	3520000 •	19386352		4 & & & & & & & & & & & & & & & & & & &
6 FLECTRIC POWER	768139.	8000H78.		*-
7 * PRIMARY OPTICS	3300000•	28776384.		
A COMM. & DATA HANDLING	4463058. 32273	<del>-</del> -	and the second s	
9 PNEUMATICS	4669540.	2070634.	/ 1	•
10 TEST & SUPPORT EQUIPMENT	25 13000 •	7119000		
11 PROGRAM MANAGEMENT	944000.	2448698.	· · · · · · · · · · · · · · · · · · ·	,
12 SYSTEM INTEGRATION	111600+	133800+		
13 PFL (ARILITY	1445220+	5820000.		•
14 QUALITY ACCEPTANCE 15 TITAN INTERSTAGE	582090.	670000		-
16 # TITAN SHOOUD	0.0	1000000-		
17 SHUTTLE INTERFACES	209100000	1997000		**************************************
	3110400.	100000		
19 TRAINERS & SIMULATORS 19 * EXPERIMENTS A & 0	5000000			
20 GROUND STATION	3251000.	000004		
21 * NEW COMPUTERS	4550000	0.0		+
and the same in th				
LAUNCH OPERATIONS				
22 * LV-TITAN	0.0	22500000.		
23 * LV-SHUTTLF		100000000		
24 S-C SUPPORT	0.0	4950000		
25_* FACILITIES	1347012.	162826.		
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000. 39000000.		
27 * FXPEDIMENT UPDATE		60000000		
24 + G.S.F.C. & DTHER	0.0	130300004		
			9000000.	
29 OPSITAL OPERATIONS	87728288+	162262320.		
G & A CHARGEABLE	11316944+	20931424	1160999•	
G & A	99045232			
SUNTOTAL	14197012	194863680.		
NON-G & A SUBTOTAL	113242240	378057728.	10160999•	
TOTAL			<del></del>	
*NO G & A CHAPGE		TOTAL	501460736.	
COST OF ADDIL SHUTTLE REPAIR FL			11999998.	
	· · <del>· ·</del>		513460480+	
GRAND TOTAL NO. OF FAILURES 8.40				•

	المقور قبل موسعون و والقالين وقدوم و والقالين والموجود والموسوم مسترسين والموجود والمواجود والمو	PERCOM PR	ROGRAM	mid-age. M mar 2 and 2 a	
-~		PROGRAM	ND.50	والمراقب وال	
	A to the state of the second s		ست حدید یا به نوبی بی بستر	معارضة موالدي والعاموسيوسي	THE REAL OF SHIPPING THE PROPERTY OF THE PROPE
	SHUTTLE SCHEDULE DELAY 2.5		من المام الله الله الله الله الله الله الل	المراجعة	المراجعة والمراجعة
	TOTAL SYSTEM MITE 18.0			•	
	VAR. SUBSYSTEM SURPF 1.25			and a make the same and the same arrangement of the	
	, , , , , , , , , , , , , , , , , , , ,				
	SHUTTLE-MAINTAINED PROGRAM			0000471045	
	(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
	1 STRUCTURE	20150000	30649216.		
	2 ENGINEFRING	17500000.	2250126.	*	•
	3 STABILIZATION	1618100.	42994209		
	4 THERMAL	2120000.	2910971.		
	S S-C MECHANISMS . M	3520000•	2721483.		
-	6 ELECTRIC POWER	768138.	19386352.		ر شه مور پ
	7 * PPIMARY OPTICS	7100000	8000478		
	A COMM. E DATA HANDLING	4463058.	28976 194 •	•	•
	PNEUMATICS	32273.	6264530. 2076634.	فيمجون فالمناف والمنافية فيستوالها فيتهيئه والمناف والمناف والمناف والمناف والمناف والمناف والمنافية والمنافية	<u> </u>
:	10 TEST & SUPPORT COULPMENT	4669540 • 2533000 •	7119000.	•	
4 -		944000	2449698	الأبثاء فللاحتفاظ والتناف الاستقار ويؤك فيهيها فيهيف البراجي وسيبى بنوجه بدو يختفون والتوقيق	
í	12 SYSTEM INTEGRATION 13 RELIABILITY	111600.	1 13800.		
	14 QUALITY ACCEPTANCE	1445220.	5820000.		•
	15 TITAN THEFRSTAGE	582000.	670000.		•
	16 * TITAN SHROUD	0.0	1900000		
	17 SHUTTLE INTERFACES	20910000.	1997000.	المعلقة فالمالية والمعالمة المواقعة وبالموالي والمعاد والمعادين الموارجة للمراجة للمواجعة	
	IN TOMINEDS & STHULATORS	3110400.	100000.		
<u> (</u>	19 A EXPERIMENTS A E.B	5000000.	39000000-		
4	20 GROUND STATION	7251000.	800000		
91	21 * NEW CHMPUTERS	4550000.	0.0		
•	LAUNCH OPERATIONS				× × × × × × × × × × × × × × × × × × ×
,	22 * LV-TITAN	0.0	22500000.	•	
	23 * LV-SHUTTLE		1 0000000.	فللبيوب شبرت المحاليون ويترجيهم وتحليبها فيهده ببيهاسي	
•	24. S-C SUPPRET	. 0.0	4990000. " 362826.		
	-25 * FACILITIES 26 * SHUTTLE UPDATE FLIGHT	1347012.	15000000		
	27 * EXPERIMENT UPDATE	0.0	39000000		•
· -	28 * G.S.F.C. & OTHER	0.0	60000000.		
J	CONTRAL OCCULATIONS		<del></del>	9000000	
	G & A CHARGEABLE	87728288.	162262720.	,,,,,,,,,,	,
	G & A CHARGEMACE	11316944.	20931924.	1160999.	•
	SUSTOTAL	79045232	183194144.		
	NON-G & A SUSTOTAL	14197012.	194863680.		
	TOTAL	113242240+	378057728.	10160999+	
•	*NO G & A CHARGE	· · · · · · · · · · · · · · · · · · ·		EALAGA774	
	The state of the s		TOTAL	501460736. 10975608.	
	COST OF ADD'L SHUTTLE REPAIR FLTS			512436224.	
	GRAND TOTAL NO. OF FAILURES 8.20			71 74 34664 6	
	UPTIME (YEARS) 12.29		•		•
	リアしょべじ もりにカペラノチボをある あどまのプ				

	PROGRAM	NO.51			
					· · · · · · · · · · · · · · · · · · ·
SHUTTLE SCHEDULE_DELAY3.0					
TOTAL SYSTEM MTTF 18:0					
VAP. SUBSYSTEM_SLOPE1.25					
SHUTTLE-MAINTAINED PROGRAM					
(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING .	RECURRING	OPERATIONS		
1 STRUCTURE		30649216.			
2 ENGINEERING	17500000.	2250126.			,
		4299420A			
4 THERMAL	2120000.	2910971.			
5 S-C MECHANISMS	760138	2721481.			
6 ELFCTATC POWER	76013% 	8000878.		s the	
7 # PRIMARY OPTICS A COMM. & DATA HANDLING	4467058.	20970394			
7 PNEUMATICS	32271,	•		•	
10 TEST & SUPPORT EQUIPMENT	4669540	2070414.			
11 PROGRAM MANAGEMENT	2533000.	7112000.			
12 SYSTEM INTEGRATION	944000.	. 2449699.			
13 RELIANTLITY	111600.	3 3 3 9 0 0 4	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	JRLE -
14 QUALITY ACCEPTANCE	1445220.	5820000.		- ۵۱	URCIDE
	582000. <u></u>	670000.		- DEBKO	V
16 * TITAN SHROUD	0.0	1000000.		"UT KE	•
17 SHUTTLE INTERFACES	20910000.	1997000.		<u> </u>	
TRAINERS & SIMULATORS	3110400.	100000		1	
19 . FXOCRIMENTS A E. B.	5000000	39000000			
20 GROUND STATION	3251000.	800000-			
21 * NEW COMPUTERS	4550000.	0.0			
TAUNCH ODERATIONS					
LAUNCH OPERATIONS 22 * LV-TITAN	0.0	225000000			
23 * LV-SHUTTLE	0.0	10000000			
24 5-C SUPPORT	0.0	4950000+			
25 # FACILITIES	1347012.	362826.			
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000			
27 * EXPERIMENT UPDATE	0.0	39000000.			
28 * G.S.F.C. & OTHER	0.0	60000000.			
			9000000		
29 DRBITAL OPERATIONS	97799900	169969390-	3000000		
G & A CHARGEABLE	11316944.	162262320. 20931824.	1160999		
, G & A SUNTOTAL	99045232.	183194144.			
NON-G & A SUBTOTAL	[4197012.	194863680.			
TOTAL	113242240.	370057728.	10160999*		
*NO G & A CHARGE					
- tip o n diranou		TOTAL	501460736+		
COST OF ADD'L SHUTTLE REPAIR FLTS		· · · · · · · · · · · · · · · · · · ·	100000000		
Carrie Cr. Laters C. Cristal Later Contract Cont			E11160600		
GRAND TOTAL			511460608.		

## PERCOM PROGRAM

## PROGRAM NO.53 SHUTTLE SCHEDULE DELAY. 12:0 ... TOTAL SYSTEM MITE..... 18.0 VAR. SURSYSTEM SLOPE.... 1.25 SHUTTER-MAINTALM D. PROGRAM CH SPACICUALTS-NOT DOTEMIZED STRUCTURE 20150000. 30649216. ENGINEFRING 17500000. 2250125. STARILIZATION 1618100. 42994208. THERMAL. 2120000. 2910971. " SHE MECHANISMS" 3520000. 42721483. + W FUECTRIC POWER 766130. 19386352. 7 PRIMARY OFFICE 3300000. 800001784 COMM. & DATA HANDLING 4463058. 28974384. PHICHATICS 32273. 6244530. TEST & SUPPORT COULPMENT 4669540. 20706 14. PROGRAM MANAGEMENT *2533000° 7119000. SYSTEM INTEGRATION 944000. 2448698. 133800. RELIABILITY 111600. QUALITY ACCEPTANCE 1445220. 59200000. 15 TITAN INTERSTAGE 582000. 670000. 16 * TITAN SHROUD 0.0 1000000. 17 ___ SHUTTLE INTERFACES 209100004 1997900. TRAINERS & SIMULATORS 3110400. 1000000 10 * EXPERIMENTS A & B 50000000 39000000. 8000000 26 GPOUND STATION 3251000. 21_ * NEW COMPUTERS 4550000. __LAUNCH OPERATIONS 225000000 22 * LV-TITAN 0.0 ___LV-SHUTTLE 100000000 0.0 S-C SUPPORT . 0.0 49500000 25 _ FACILITIES 7 362826. 1347012. 26 * SHUTTLE UPDATE FLIGHT 0.0 150000000. 27 * EXPERIMENT UPDATE 39000000. 0.0 28 * G.S.F.C. & OTHER 0.0 600000000 DREITAL OPERATIONS 9000000. G & A CHARGEABLE 87728288. 162262320. 1160999. 11316944. 20931824. G & A SUBTATAL 99045232. 183194144. 14197012. 194863680. NON-G & A SUBTOTAL TOTAL 113242240. 378057728. 10160999 *NO G & A CHAPGE 501460736 COST OF ADDIL SHUTTLE REPAIR FLTS GPAND TOTAL NO. OF FAILURES.... 5.60 UPTIME (YEARS) ..... B.40

UPTIME RATIO.....

	PERCOM PR						
	PROGRAM	NO 454	*		• ,		
SHUTTLE SCHEDULE DELAY 24.0			and the seconds of the same is the second as an extension to				
TOTAL SYSTEM MITE 18.0			•	•			
VAR. SUBSYSTEM SLOPE 1.25		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				•	
		********	· · · · · · · · · · · · · · · · · · ·			,, <u></u>	<del></del>
SHUTTLE-MAINTAINED PROGRAM	NON-RECURRING_	RECURRING	DPERATIONS			<u> </u>	<del></del>
(3 SPACECRAFT)-NOT NOTIMIZED				'		*	
1 STRUCTURE	20150000.	30649216					
2 ENGINEERING	17500000	2250126.		, ,		۹,	
3 STABILIZATION	1618100.	4299420A				<del>-, `</del>	
4 THERMAL	2120000.	2910971.					
5 S-C MECHANISMS	3520000.	2721483.				,	
S FLECTULE CONEG	~ 768138 · ****		•	m settler "there "	<b>*</b>	4 - 42	
7 * PRIMARY OFFICS	3300000	8000878.	<del></del>				•
8 COMM. & DATA HANDLING	4463058*	28976394		1	•	-	,
9 PNFUMATICS	32273.	6264530. 2070634.	<del></del>				
10 TEST & SUPPRRY FOUTPMENT	4669540.	7119000=					
11 PROGRAM MANAGEMENT	2533000•	2448698.	<del></del>	A	•		•
12 SYSTEM INTEGRATION	944000	131900:	,	·	<u> </u>		
13RELIANILITY	111600	5420000-				•	
14 QUALITY ACCEPTANCE	1445220•	670000				<u></u>	
1'S TITAN INTERSTAGE	582000•	1000000					•
16 * TITAN SHOOUD	20910000	1997000.					
17 SHUTTLE INTERFACES	3110400•	100000-				•	
18 TRAINERS & STHULATORS	5000000	39000009.					
19 * EXPERIMENTS A & B	3251000.	600000.					
20 GROUND STATION	4550000.	0.0					<del></del>
21 * NEW COMPUTERS							
LAUNCH OPERATIONS	o.o	22500000.	a description of the state of t				
22 * LV-TITAN	0.0	10000000.					
27 * EV-SHUTTLE	0.0	492,00000		•	•		
24 S-C SUPPORT	1347012.	362826+		·			
25 * FACILITIES	0.0	15000000.	•				
26 * SHUTTLE UPDATE FLIGHT	0.0	39000000°					
27 * FXPFRIMENT UPDATE	ò.0	60000000	ī			, ,	
28 * G.S.F.C. & OTHER	•			<del></del>	h	<del></del>	4
29 ORBITAL OPERATIONS	<del></del>		, 9000000•			*	•
G & A CHARGEABLE	87728288·	162262320.					
G & A	11316944	20931824+	11609990		*	-	
SUBTOTAL	99045232+	181194144					
NON-G & A SUNTOTAL	14197012.	194863630.	1.01.60000				
TOTAL	113242240	378057728	1 01 60999•_				
NO G & A CHAPGE		TOTAL	501460736+		,		
TOTAL TOTAL TOTAL TOTAL CONTRACTOR		was a first transfer of the state of the sta	0.0				
COST OF ADD'L SHUTTLE REPAIR FLTS			501460736+_			<del></del>	<del></del>
NO. OF FAILURES 4.00							,
UPTIME (YEARS) 6.00			, ,				

		PERCOM PR	DGRAM		
		PROGRAM	•		
<u></u> دھ				i grand the section when the section and the section of the sectio	
	HUTTLE_SCHENULE_DELAY.,0.5 DTAL SYSTEM MITF 21.0				
	V&* ZAUZAZIEM ZľUBE**** ***		•		
······································	سنستست في عالم والمساولة في في المراكز وي الأرث و وي وي من المالو في المراكز و المراكز و المراكز والمراكز والم			<u></u>	
•					
	SHUTTLE-MAINTAINED PROGRAM			,	·····
(	(3 SPACECPART) NOT OPTIMIZED	NON-RECUPRING	RFCURRING	OPERATIONS	
• •			• • • • • • • • • • • • • • • • • •	***********	•
	1 STRUCTURE	70150000.	10049216		
j	2 ENGINEERING	17500000.	2250126.		•
	3 STATILITATION	21 30631.	56612560		<del></del>
	4 THERMAL	2120000	2910071.	,	
	S S-C MECHANISMS	35200004	2721483.		<del></del>
	5 ELECTRIC POWER 7	1011444.	25526944.	adverse a market	
	9 COMM. & DATA HANDLING	3300000			
	O PARIMATICS	5876740. 42495.	38154794. 8248830.	•	
	10 TEST & SUPPORT FOUTPMENT	424934 4669549.	2079630.	<del></del>	
	I PROGRAM MANAGEMENT	Z5J3000.	71 1 9000 •	•	ť
	IS SYSTEM INTEGRATION	944000	2448698		<del></del>
_	RELIABILITY	111600	133800	· · · · · · · · · · · · · · · · · · ·	• .
	14 QUALITY ASCEPTANCE	1445224.	5920000	OIICIBE.	
	IS TITAN INTERSTAGE			- sorono	•
	16 * TITAN SHROUD	0.0	1000000	NOT REPRODUCIBLE	
	17SHUTTLE INTERFACES	. 209100004	1997000.	1, 40,	
	PROTALINEDS & STRULATORS	3110400.	100000.		
1	19 * EXPERIMENTS A & B	5000000.	39000000.	\ · *	
	PO GROUND STATION	3251090.	900000	•	<del>,</del>
7	1 * HEM COMBUTERS	4550000.	0.0	**************************************	
	LAUNCH OPERATIONS		1		
~~~ 2	22 * LV-TITAN	0.0	22500000.		
7	PS # LV-SHUTTLF	0.0	10000000		
2	SA S-C SUPPORT	0.0	4950000.		
	PS * FACTI ITTES	1347012-	362826.	·	
7	PA . SHUTTLE UPDATE FLIGHT	0.0	15000000.		
7	77 _* EXPERIMENT UPDATE	0.0	390000000	* 4. %	
2	PR * G.S.F.C. G OTHER	0.0	60000000	,	
	9 ORBITAL OPERATIONS			9000000	
£	G & A CHARGEARLE	89908016.	193183872.	>0 + 0 0 0 0 0	
	G & A	11598129.	24920704	1160999	
	SUBTOTAL.	101506144.		- • · · • · · •	
	NON-G & A SUBTOTAL	14197012.	194863680.	. a	
	TOTAL	115703152.		10160999.	
	*NO G & A CHARGE				
	COST OF ADD'L SHUTTLE REPAIR FL		TOTAL	538832128.	
•		.15		9069766.	
	GRAND TOTAL			547901696.	
	NO. OF FAILURES 7.81 URTIME (YEARS) 13.67		•		
	UPTIEND LYPAYDIAAAAA 13A67				

	والمراجعة والمرا	PROGRAM	NO.86	and the second s		······································
	•	inclinicum :	114 9 34	•		
					- manager to any other than the same of th	
CHILL	LF SCHEDULE DELAY 11.0					
TOTAL	SYSTEM MTTF 21.0			•		
	· · · · · · · · · · · · · · · · · · ·			_		
		.,		.,	to the same of the	
SHUT	TLE-MATHYAINED PPOGRAM	_				
(3 9	PACECRAFT)-NOT OPTIMIZED	_ NON-RECURRING	"" BECOBSING ""	OPERATIONS	<u>A</u>	
	*********************		70443744	*****		
¹	STRUCTURE	20150000• /	30647716+ 			
S	ENGINEFRING	17500000. 2130631.			•	
3 ·	STABILIZATION	2120000.	2910971			
4	THERMAL	3520000.	2721483.			
⁵ .	S-C MECHANISMS	1011444.	- = - 25525744.			
5	ELECTRIC POWER' "	3700000	400097H•		•	
⁷	• PRIMARY DETICS	5876740.				
Pi	COMM. & DATA HANDLING	42475.	8244810 •			
° °, ·	PREUMATICS	4669540.	2070634		الله الكله الدولة في المواجعة المواجعة المواجعة المواجعة المواجعة المواجعية المواجعة المواجعة المواجعة المواجعة - المواجعة	
10	TEST 6 SUPPORT FOULPMENT	25 13000				
11	PROGRAM MANAGEMENT	944000	2448699.			•
1?	SYSTEM INTEGRATION	· -	1 1 1400 •			-
	RELIAGILITY	111600.	5920000	المناسبة والمناسبين والمناسبة والمناسبة والمناسبة والمناسبة والمناسبة والمناسبة والمناسبة والمناسبة والمناسبة		
14	DUALITY ACCEPTANCE	582000.			•	
	TITAN INTERSTAGE	9.0	1000000			
15	* TITAN SHROUD	209100000	• • • •		_	
	SHIFTLE INTERFACES	31 10400.	100000.			
19	TRAINERS & SIMULATORS	5000000.			•	
	• EXPERIMENTS A C B	3251000.	800000.			
	GROUND STATION * NEW COMPUTERS	4550000.	0.0			
" -	A REAL CHAIRM LLAA					
	LAUNCH OPERATIONS					
. 22		0.0	22500000.			
23		0.0	10000000.	•		
'2a'	S-C SUPPORT	0.0	49500000			
25		1347012.	362826+			
	* SHUTTLE UPDATE FLIGHT	*0.0	15000000			
	* FXPERIMENT UPDATE	0.0	390000000			
	* G.S.F.C. & OTHER	0.0	60000000		· · · · · · · · · · · · · · · · · · ·	
29	ORBITAL OPERATIONS			- 9000000	•	
• •	G & A CHARGEABLE	89908016.	193183972			
	G & A	11598120.	24920704.	1160999.	•	
	SUSTOTAL	101506144.	218104576•		<u> </u>	
	NON-G & A SUBTOTAL	14197012.	194863680.			
	TOTAL	115703152.	412968192+	10160999.		
	NO G & À CHARGE					
			TOTAL	538832128.		
····	COST OF ADD'L SHUTTLE REPAIR FLYS		•	8181815.		
	GPAND TOTAL			54 70 1 3 9 8 8		
	NO. OF FAILURES 7.64					
	UPTIME (YEARS) 13.36)	

•

	•	PERCOM PE		
		PROGRAM		
			AND	And and the second seco
	SHUTTLE SCHEDULE_DCLAY., 1.5			
·····	TOTAL SYSTEM MITE 21.0			<u></u>
	VARSUBSYSTEM_SLOPE1.25			
		, ,		
	(3 SPACECUAFT)-NOT OPTIMIZED	NON-RECURPING_	RFCURPING	OPERATIONS
	1 STRUCTURE	20150000•	·— — · · · · · · · · ·	
•	2 ENGINFERING	17500000	2250126.	
	3 STABILIZATION	2130631	56612360* 2910971*	
	4 THERMAL	2120000.	29109714 2721483•	
	5 as SHC MECHANISMS	3520000• <u>.</u>	25526944•	. <u> </u>
	6 FLECTRIC POWER	3300000	#0000878	
	7 # POTUNGY OPTICS	5876740	38154704.	
	A COMM. & DATA HANDLING	42495	8249830.	1015
	9 PNEUMATICS 10 TEST & SUPPORT FOUTPMENT	4669540.	2070634.	NOT REPRODUCIBLE
		25 13000	7119000.	NOT REPROD
	12 SYSTEM INTEGRATION	944000 •	. 2448698.	. 101
	13 RELIASTILITY	111600.	1 14800	
	14 QUALITY ACCEPTANCE	1445220.	5820000.	
	15 TITAN INTERSTAGE	582000.	670000.	
	16 * TETAN SHROUD	0.0	1000000	
	17 SHUTTLE INTERFACES	20910000.	1997090+	
	IR TRAIMERS & SIMULATORS	3110400.	100090.	
	10 * EXPERIMENTS A & B	5000000.	39000000.	
	20 GROUND STATION	3251000.	800000 <u>+</u>	,
-	21 * NEW COMOUTERS	4550000•		
	LAUNCH OPERATIONS	0.0	22500000.	
	22 * LV-TITAN	0.0		
	_27 * LV-SHUTTLE	0.0	4950000.	which appropriate or the house on a second s
	24 S-C SUPPORT 25 ** FACILITIES :	1347012.		and the second s
-	26 + SHUTTLE UPDATE FLIGHT	0.0	15000000	
	27 * EXPERIMENT UPDATE	0.0	39000000.	
	28 * G.S.F.C. & STHER	0.0	60000000	
				9000000
	29 ORBITAL OPERATIONS		107107070	
	G & A CHAPGEABLE	8990A016.	1931838724	1160999•
•	G & A	11598129.	218104576.	6 \$ UV 7 7 7 8
	SUSTOTAL	101506144	194863680	
	NON-G & A SUBTOTAL	14197012.	4129681924	10160999.
	YOTAL.	115703152	ALEC AGIST ALE	
	NO G & A CHARGE		TOTAL .	538832128.
	COST OF ADDIL SHUTTLE REPAIR FLTS		and the transfer of the second	733331.
				546165248.
	GRAND TOTAL NO. OF FAILURES 7.47			MANAGE PRESE
	かけん ひに にんまんけいしゅうりゅう ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・		_	

·	PROGRAM N		***************************************	-
	PHUGRAM N			\$
SHUTTLE SCHEDULE DELAY 2.0				
TOTAL SYSTEM MTTF 21.0			reaction of the time of time of the time of time o	
VAR. SUDSYSTEM SLOPE 1.25				·
	• • • • • • • • • • • • • • • • • • • •	•••••	•••••••	
SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED	HOW OF CHIRD ING	DECHODING	OPERATIONS	
(3 SPACECHARITHNOT OFFICE COMP.	NON=KI COKK ING			*
1 STRUCTURE	20150000.	30649216.		
2 ENGINEERING	17500000	2250126.		, ,
3 STABILIZATION	2130631.	56612560.		
4 THERMAL	2120000.	2910971.		
S . S-C MECHANISMS	35200004	272t4844		
A FLECTRIC POWER	1011444.	25526944.		
7 * PRIMARY OPTICS	3100000	: нооочти	· · · · · · · · · · · · · · · · · · ·	
A COMM. & DATA HANDLING	5676740.			
9 PHEUMATICS	424ባጜ•	ASARRIO.		
	4669540.	2070534.	•	
11 PROGRAM MANAGEMENT '		7119000		*
12 SYSTEM INTEGRATION	944000.	2448699.		•
13 RCLIAGILITY	111500.	1.33900.		
14 QUALITY ACCEPTANCE	1445770.	5020000.	•	
15 TITAN INTERSTAGE	502000	1000000		
15 * TITAN SHRRUD	0.0			
17 SHUTTLE INTERFACES	20910000. 3110400.	100000.		
19 TRAINERS & SIMULATORS		390000000		
19 * EXPERIMENTS A 6 B	3251000.	600000		
21 * NEW COMPUTERS	4550000.			
		·-		
LAUNCH OPERATIONS				
22 * LV-TITAN	0.0	22500000.		
73 * LV-SHUTTLE	0.0	10000000.		
24 S-C SUPPORT	0.0	4950000+		
25 * FACILITIES	1347012.	362826	- 100 4 400 4000	
25 * SHUTTLE UPDATE FLIGHT	0.0	15000000.		
27 * EXPERIMENT UPDATE .	0.0	39000000		
28 * G.S.F.C. & OTHER	0.0	60000000.		,
			9000000	
29 ORBITAL OPERATIONS	80000016.	193183872.		
G & A CHARGEABLE	11598129.	24920704.	1160999•	
SUBTOTAL	101506144.	218104576.		
NON-G & A SUSTOTAL	141970124	194863680.		
TOTAL	115703152.	412968192.	10160999•	
NO G & A CHARGE				
THE POST OF THE PROPERTY OF		OTAL	538832128.	
COST OF ADDIL SHUTTLE REPAIR FL	TS		6521735.	
GRAND TOTAL			545353728.	
NO. OF FAILURES 7.30				•

		PROGRAM	NO.60		
				transferred them is not been been been been been been been bee	
	7.0				
	SHUTTLE SCHEDULE DELAY 3.0 TOTAL SYSTEM MTTF 21.0				
	VAR. SUBSYSTEM SLOPE 1.25	كمواليل			
	SHUTTLE-MAINTAINED PROGRAM			0000474000	
	(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
			20600016.	•••••	
	1 STRUCTURE	20150000	2250126		
	S ENGINCEDING	17500000. 2130631.	56612560.		
	3 _ STABILIZATION	2120000.	2910971.		
	4 THERMAL	35200004	27214113.		
	5 ' S-C MCCHANISMS "	1011444.	25526944.		
	6 ELECTRIC POWER	3300000	8000378+	/ 🐫	
	7 * PRIMARY OPTICS B COMM. 6 DATA HANDLING	5976740.	38154704.		
	R COMM. E DATA HANDLING O PREUMATICS	42495.	A244810.	,,,,,,,	<u> </u>
<u> </u>	TEST & SUPPORT EQUIPMENT	4669540.	2070534.		
	11 PROGRAM MANAGEMENT		7119000.		
	12 SYSTEM INTEGRATION	944000.	2448698.	REPON!	•
	13 RELIABILITY	1116004	1 13300.		
	14 QUALITY ACCEPTANCE	1445220.	. 58200NO.	White the same of	
	15 TITAN INTERSTAGE	582000.	670000.		
	16 - TITAN SHROUD	0.0	1000000•	`	•
	17 SHUTTLE INTERFACES	20910000+	1997000+		
	18 TRAINTRS & STHULATORS	3110400.	100000.		
	19 . EXPERIMENTS A & B	5000000	 		
	20 GROUND STATION	3251000.	800000		
	PI * NEW COMPUTERS	4550000.		gy ng	<u> </u>
	- 				
	LAUNCH OPERATIONS				
	PP * LV-TITAN	0.0	22500000.	•	
	27 * LV-SHUTTLE		4950000		
	24 S-C SUPPORT	0.0	362826•		
	25 * FACILITIES	1347012.	15000000		* ************************************
	26 * SHUTTLE UPDATE FLIGHT	0.0	39000000		
	27 * EXPERIMENT UPDATE	0.0	60000000		
	28 * G.S.F.C. & OTHER	0.0			
	29 DRAITAL OPERATIONS			9000000.	
	G B A CHARGEABLE	89908016.	193183872.	and the board of the control of the	
	- G & A	11598129.	24920704.	1160999.	
	SUBTOTAL	101506144.	218104576.		
	NON-G & A SUBTOTAL	14197012.	194863680.		
	TOTAL	115703152.	412968192.	10160999.	
	*NO G & A CHARGE				
			_TOTAL '	538632128.	
	COST OF ADDIL SHUTTLE REPAIR	FLTS		5000000.	
	GRAND TOTAL			543832064	
	NO. OF FAILURES 7.00				
	UPTIME (YEARS) 12.25				

		PERCOM PR	OGRAM 😝			,
	<u> </u>	PROGRAM	NO.61			1
	TTLE SCHEOULE DELAY 6.0					
	AL SYSTEM METERON 21.0					
V 4+4 ;	SUNSYSTEM_SEADE					
7 SHI	UTTLE-MAINTAINED PROGRAM	•				
(3	SPACECPART)-NOT OPTIMIZED	NON-RECURRING_	RECURRING	OPERATIONS		
		<i></i>		******		•
1.	STRUCTURE	20150000.			······································	
. 2	ENGINFERING	17500000.	2250126.			∢
3.	STABILIZATION		56612560 ·			
4	THERMAL	2120000+	2910971.		, p.,	
5	S-C MECHANISMS		25526944	والمرابع والمرابع والمرابع والمرابع والمرابع والمرابع والمرابع والمرابع والمرابع		
- A	FLECTRIC POWER " "	101444. 3700000.	235289444 4000478•			
		5876740.	39154700+			
8	COMM. E DATA HANDLING	42495.	424AR30.			
	PMEUMATICS TEST & SUPPRIET FOULPMENT	4669540.	2070634	المتنابك فالهيؤونية الهيونية فالهيون ومراهد ومناهي والمتناب والماس والمتناب المراهد والمراهد والمراهد والمتناه	······································	
10		25 13000				
	PROGRAM MINAGEMENT SYSTEM INTEGRATION	944000.	2448698			
17	RELIABILITY	t11600	1 13800.			
1 4	QUALITY ACCEPTANCE	1445220.	5820000.		,	
15	TITAN INTERSTAGE	582000.	670000			
	* TITAN SHROUD	0.0	1000000.			
	SHUTTLE INTERFACES	20910000.	1997000.	-		
18	TRAINERS & SIMULATORS	3110400.	100000.			
10	* EXPERIMENTS A 6 B	5000000.	39000000.			
20	GROUND STATION	3251000.	800000			
21	# MEN COMPUTERS	4550000.				
	_ LAUNCH OPERATIONS		2050000			
	* LV-TITAN	0.0	22509000•			
	* LV-SHITTLE		4950000			
24		0.0 1347012.	362826.			
	* FACILITIES	1147012+	15000000.			
	* SHUTTLE UPDATE FLIGHT * EXPERIMENT UPDATE	0.0	39000000			
	* G.S.F.C. & OTHER	0.0	60000000			
<i>E</i> (1)	- THE PER MICH. IN TOTAL IN	0.0				
20	OPRITAL OPERATIONS			9000000		
- *	S & A CHARGEABLE	89908016.	193183872.			
	GEA	11598129.	24920704.	1160999•		
	SUBTOTAL	101506144.	210104576+			
	NON-G & A SUSTOTAL	14197012.	194863680.			
	TOTAL	115703152.	412968192.	10160999		
	*ND G & A CHARGE					
		oy was four money have for a	TOTAL	538832128•		
	"COST OF ADDIL SHUTTLE REPAIR FI	LTS		0.0		
	GRAND TOTAL			53AA3212A.		
	NO. OF FAILURES 6.22					
	UPTIME (YEARS) 10.89					
	UPTIME RATIO 0.73					

PERCON PROGRAM

	PROGRAM	NO - 64		1
				*
SHUTTLE SCHEDULE_DELAY	0.5			
TOTAL SYSTEM MITE				, , , , , , , , , , , , , , , , , , , ,
VAR. SUBSYSTEM SLORE				
				•
		• • • • • • • • • • • • • • • • • • •		
SHUTTLE-MAINTAINED PROGRA		DECUDETAG	0050471046	
(3 SPACECRAFT)-NOT OPTIM	VON-KECOKK ING	RECURRING	UPPRATIONS	
1STRUCTURE	20150000.	30649216.		→
2 ENGINEERING	17500000	2250126.		
3 STABILITATION	2694125.			•
4 THERMAL	2120000.	2910971.		* >
54 S-C MECHANISMS		2,721483		
6 FLECTRIC POWER	1278944.	32278160.		
7 * PPIMARY HOTICS	.000005	8000878.		
8 COMM. & DATA HANDLI	·			//
9 PNEUMATICS	53735.	10430453+		RODUCIBLE
to TEST & SUPPORT EOU!	PMENT 4669540.	2070634.		<u> </u>
11PROGRAM MANAGEMENT	2533000.	7119000.		
12 SYSTEM INTEGRATION	944000.	2448698+		-00
13PELIABILITY	111500.	13800		£2
14 QUALITY ACCEPTANCE	1445220.	5820000.	/ & [©]	
15TITAN INTERSTAGE	582000.	679000.	/ \ \ \	,
IS # TITAN SHROUD	0.0	1000000.		
_ 17 SHUTTLF INTERFACES				
18 TRAINCRS & SIMUL		100000.	`	
19 * EXPERIMENTS A & B_	5000000.	39000000		
20 GPRUND STATION	3251000.	800000.		
21#_ NEW COMPUTERS	4550000.	0.0		
LAUNCH COCCATIONS				
LAUNCH OPERATIONS - 22 · * LV-TITAN	0.0	22500000.		
23 * LV-SHUTTLE	0.0	10000000.	•	
24 S-C SUPPORT	0.0	4950000		
25 * *FACILITIES	1347012.	362826*		
26 * SHUTTLE UPDATE FEIG	· · · · · · · · · · · · · · · · · · ·	150000000		
27 * EXPERIMENT UPDATE	0.0	39000000	•	
28 * G.S.F.C. & OTHER	0.0	60000000		
_		- · · · ·		
29 ORBITAL OPERATIO	NS		9000000.	
G & A CHARGEARLE	92304512.	227180288.		
G & A	11907277.	29305240.	1160999,	
SUSTOTAL	104211776.	256486528		
NON-G & A SUBTOTAL	14197012.	£94863680•		
TOTAL	118408784.	451350016	10160999•	
*NO G & A CHARGE				
		TOTAL	579919616.	
COST OF ADDIL SHUTTLE	REPAIR FLTS		0.0	
GRAND TOTAL			579919616.	

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		PERCOM PROC	GRAM		الكامة - الله المواجعة	
معدنولبنية ماروبينين بالهداء الم الاحامد	man is also or to be proposed in the control of the	PROGRAM NO	0.63	• • • ·		
	and the support of th	padar	ung mang dar der te menter derste vond vid		are notice to recover the ret and the	mint for the same of substitutions of animals of the party.
	· • · · · · · · · · · · · · · · · · · ·					
SHUTTLE SCHEDU	_F DFLAY 24.0		ay and any deep on			
TOTAL SYSTEM M	TTF 21.0					
VAD. SURSYSTEM	SURPE 1-25		enter a se productiva a la la se manadage.			
		• • • • • • • • • • • • • • • • • • • •				
SHUTTLE-MAINT	VINCO BRIGHAM	NON-RECURRENG	RECURRING	OPERATIONS		
)-NOT OPTIMIZED					
***********		20150000	30549216.			
STRUCTI	OF COLUMN	17570000.	2250126*			A 114
3 STATILI		2130631.	56612560• ,	parament happens and the the the the the parameter of the temperature of temperature of the temperature of temperature of temperature of temperature of temperature o		
A THERMAL	2 44 1 2 1217	2120000•	2910971*			
5 5-C MFC	- ZUZ 116ALI	3520000.	<u> 2721483</u>		-14 h 454 	
6 TUTCTO	C POWER	1011444+	25920944*			
7 # PRIMARY		3100000	B\$P000R	this desiration of the section of th		
	DATA HANDLING	58/6740.	38154704.		• •	
O DAFUMA		42495.				
10 TEST 6	SUPPORT COULDMENT	4669540.	20706 14 +			
11 PROGRA	MANAGEMENT	25 13000.				
	INTEGRATION	944000.	24486994		• •	
• •	1.1TY	111600.	1 3 1800		······································	
14 DUALIT	ACCEPTANCE	1445220 •	5820000·			
15 TITAN	NTERSTAGE	592000.				•
16 * TITAN '	HPGUD	0.0	1997000.			
17 SHUTTLE	INTERFACES	200100000	100000			
IR TRA	NERS & STMULATORS	3110400.	39000000			
	ENTS A. E. A.	5000000.	800000			
20 เรากบทก	STATEON	3251000.	0.0			·
21_ * NEW C	MINITORS	4550000.				
LAUNCH O	PERATIONS					· · · · · · · · · · · · · · · · · · ·
		0.0	22500000•			
23 . # LV		0.0	10000000			
24 S-C	SUPPORT	0.0	47500004			
• •	LITIES	1347012.				-
26 * SHUTTL	UPDATE FLIGHT	0.0	15000000.			
27 * FXPERI	MENT UPDATE		39000000.			
~~~ 28 ° * G.S.F.	. & OTHER	0.0	60000000		•	
				9000000		
HAU USH	TAL OPERATIONS	00000015	193183872.		,	
G G A CH	ARGEABLS.	89908016	24920704	1160799.		
G & A		115981294	218104576.			
SUBTOTAL		14197012.	194863680.			
	A SÜBTOTAL	115703152+	412968192+	10160999.		
TOTAL		110/031364				
*NO G &	A CHARGE		TOTAL	538632128+		
	ADDIL SHUTTLE REPAIR FL		· · · · · · · · · · · · · · · · · · ·	0.0		,
				538832128		,,,, <del>,</del> ,,,,,,_,,_,,,
GRAND TO	TAL Allures 3.73		,			
NO. OF F	ALLURES 3.73 YCARS) 6.53					
	ATIO 0.44					
HOTING N	// I					

			PROGRAM	NO.65			•
	4						
	*******	TLE SCHEDULE DELAY** _ 1 * 0					
	****	EVETER RETERIOR 24.0			•		
\	AR.	SUBSYSTEM_SLOPE 1 . 25					
	• • • •	• • • • • • • • • • • • • • • • • • • •		4		new private dynamics in the property with the party of comments of the party of the	
	SHUT	TTLE-MAINTAINCD PROGRAM SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS		
-	(	SPACICRAFT JOHNIII (NOS IMIZED					
•	1	STOUCTURE	20150000.	30649216			
	_ 2 _	ENGINEERING	17500000.	2250126.		•	
	4	STABILIZATION	2694125	71585056			
	4	THERMAL	2120000.	2910971.		ت پونوانس ـ در	
	<b>.</b> 5	S-C MECHANISMS A		. 2721481.			
	ี 6	ELECTRIC POWER	1278944.	32278160.			
		* DRIMARY DOTICS		8000978+			
	6	COMM. & DATA HANDLING	74 11 00 7 •	48245776.			
	_ • <u>,</u>	PNEUMATICS	53735.	10430453• 2070534*		REPRODUCIO .	<del></del>
	10	TEST & SUPPORT FOUTPMENT	4669540.	7119000.			
	_ ! !	PROGRAM MANAGEMENT	25 13000 ·	24486994			
	12	SYSTEM INTEGRATION	111600.	- · · · · · · · · · · · · · · · · · · ·		184	
		RELIABILITY	1445220	5420000		7 6	
	14	QUALITY ACCEPTANCE	= :: :	670000	*	· ·	
		TITAN INTERSTAGE * TITAN SHPRUD	0.0	1000000.		10,	
	-	SHUTTLE INTERFACES		1997000.			
	- ¦ ′	TRAINERS & SIMULATORS	3110400.	100000.			
	10	* EXOPPENENTS A & B	5000000.	39000000+			
		GROUND STATION	3251000.	800000		,	
	-	* NEW COMPUTERS	4550000.	0.0			
	•						
		LAUNCH OPERATIONS					
		* LV-TITAN	0 • 0	22500000.			
	_ 23	*LV~SHUTTLF		10000000			
	24.	- ,	0.0	4950000.			
		.+ FACILITIES	1347012.	15000000			
		* SHUTTLE UPDATE FLIGHT -	0.0	39000000			
		_ + EXPERIMENT UPDATE	0.0	60000000			
	23	* G.S.F.C. & OTHER	0.00	The state of the s			
		DROITAL OPERATIONS			9000000		
	2.1	G & A CHARGEARLE	92304512.	227180288			
	·	G & A	11907277.	29306240.	1160999.		
		SURTOTAL	104211776	256486528			
		NON-G & A SURTOTAL	14197012.	194863680.			
		TOTAL	118408784	451350016	10160999		
		*NO G & A CHARGE	-				
				TOTAL	579919616.		
		COST OF ADD'L SHUTTLE REPAIR FL	TS		0.0		
		GRAND TOTAL			579919616		
		NO. OF FAILURES 6.72					

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	PROGRAM	1 NO.66	and the second section of the s	
SHUTTLE SCHEDULE DELAY 1.5 TOTAL SYSTEM MITE 24.0				
VAR SURSYSTEM SLOPE 1.25	4			
A 10 10 10 10 10 10 10 10 10 10 10 10 10				
SHUTTLE-MAINTAINED PROGRAM				
(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	_ RECURRING	OPERATIONS	
	20150000	30649216.		
1 STRUCTUPE	17500000	2250126+		" ,
2 ENGINEERING	2694125	71595056		ı
3 STABILIZATION	2120000	2912071.	The same of the sa	
S S-C MECHANISMS * *	3520000.	2721481.	·	
6 FLECTRIC POWER	1278944.	322/0160.	C 24 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	·
7 # PREMARY PRITES	3300000.	8900878		
9 COMM. & DATA HANDLING	74 11007.	48245776.		
9 PNEUMATICS	53735.	104 1045 1		
10 TEST & SUPPORT FOUTPMENT	4659540.	2070614.	• •	
11 PROGRAM MANAGEMENT	25 3 3 0 0 0 0	7119000		
12 SYSTEM INTEGRATION	744000.	, 2448698.		•
13 RELIABILITY	111600	134400.		
14 QUALITY ACCEPTANCE	1445220.	5820000•		
15 TITAN INTERSTAGE	582000.			
THE TEXT SHOUD	0.0	1000000		
17 SHUTTLE INTERFACES	20910900	1997000		
18 TRAINERS & SIMULATORS	3110400.	100000.		
19 * EXPERIMENTS A 6-8	5000000.			
20 GROUND STATION	3251000.	0.00000		
21 W NEW COMPUTERS	4550000	0.0	the second section of the second section of the second sec	
				•
LAUNCH OPERATIONS	0.0	22500000		
22 * LV-T.I TAH	, 0.0	10000000.		
23 * LV-SHEFTEE	0.0	4950000.		
25 # FACILITIES	1347012.	362926.		
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000		••
27 * EXPERIMENT UPDATE	0.0	39000009.		
24 * G.S.F.C. 6 OTHER	0.0	60000000		
*				
29. ORBITAL OPERATIONS			9000000	• •
G & A CHARGEABLE	92304512.	227180289.		
G E A	11907277.	29306240+	-1160999•	
SUBTOTAL	104211776.	256486528		
NON-G & A SUBTOTAL	14197012#	194963680.	1.05.40000	
TOTAL	118408784+	451350016.	10160999•	
NO G & A CHARGE		TOTAL	570010616-	
N = 00000 0		TOTAL	579919616. 0.0	<u></u>
COST OF ADD'L SHUTTLE REPAIR FLT	5	•	579919616.	
GRAND TOTAL			. 1. 1. 2. 2. 3. 3. 3. 4. C. B	
NO. OF FAILURES 6.59				

		PROGRAM N	0.67			•
CHITTIF	SCHEDULE_DELAY 2.0		والمراجعة المراجعة المستقدم ال	ميدو هد هما چې ه د د باخي پېښومورومور		
	24 ^					
VAR. SUF	15 15 M MITT				······································	•
					•	•
		*************	************	1 7 1 2 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		
SHUTTLE	F-MAINTAINED PROGRAM SECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS _		
( 3 SIZAC						
1 <	TRUCTURE	20150000.	30649216+			
. 2	INGTHEERTNG	17500000•	5850156*			
3 5	STARILIZATION	2694125.				
4 °T	FHERMAL	2120000·	2910971.			
	S-C PECHANISMS		2721483.			
6 E	ELECTRIC POWER	1278944.	32278160.			
7*_F	PRIMARY OFFICS	3100000+	48245776.	<u> </u>		
	COMM. & DATA HANDLING	7431007。 				•
	PNEUMATICS	4669540.	2070634.			
	TEST & SUPPORT FOUIPMENT PROGRAM MANAGEMENT	2533000				
	SYSTEM INTEGRATION	944000	2449699.		,	
	RELIABILITY	111600.	133800			
	QUALITY ACCEPTANCE	1445220.	5820000.		•	
	TITAN INTERSTAGE	582000	670000			<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>
16 * '	TITAN SHROUD	0 • 0	1000000			
17 1	SHUTTLE INTERFACES		1997000			······································
	TRAINERS & SIMULATORS	3110400+	100000.			
	FEBERTHENTS A 6_B		39000000			**************************************
_	GROUND STATION	3251000.				
21*	NEW COMPUTERS	4550000				
	UNCH OPERATIONS					
	LV-IIIVA	0.0	22500000.			
	LV-SHUTTLE	0.0	10000000			
24	S-C SUPPORT	0.40	4950000.			
	FACILITIES	1347012.	362926			
26 4 5	SHUTTLE UPDATE FLIGHT	0.0	15000000			
27 + 1	EXPERIMENT UPDATE		<del></del>			<u></u>
28 *	G.S.F.C. & OTHER	0.40	60000000			
				9000000		
29	ORBITAL OPERATIONS	02704512.	2271 00200			
	E A CHARGEARLE	92304517.	29 106240	1160999.	2 % M 44 444 PRINCE WITH SALES WATER	
	6 A	104211776	256486528			-
	RTOTAL N-G & A SURTOTAL	14197012.	194863680.			
	TAL	118408784.	451350016	10160999+	u	<u> </u>
	O G & A CHARGE		·····			
			TOTAL	579919616		
cn	ST OF ADDIE SHUTTLE REPAIR FLTS	5		0.0		
	AND TOTAL		,	579919616+		
	. OF FAILURES 6.46		•			
	TIME (YEARS) 12.92					

*				and the second section of the sectio			<del></del>
		PROGRAM	NO • 6 B	•		2	. ,
-	and the princip of the second		<b>.</b>	and approximate and the second			L
SHUTT	TLE SCHEDULE DELAY 2.5	·				<u> </u>	
	SYSTEM MITF 24.0			•			
	SUBSYSTEM SLOPE 1.25						<del></del>
				,			
			•••••				
	TTLE-MAINTAINED PROGRAM		ossumatus	ADCOAT FONC			
(3 :	SPACECRAFT)-NOT OPTIMIZED		RECURSTNG	OPERATIONS			
****		20150000	30649216.				
<u>`</u>	STRUCTURE	17500000	2250126				<del>,</del> ,
2	FNGINEERING	2694125•	71589096	•	-	•	
- ,	THERMAL TATION	\$150000	2910971				*******
=	S-C MECHANISMS -	3520000	2721493.	ţ		10	-
	ELECTRIC POWER	1278944.	32278160.				
7	* PPIHARY OPTICS	3300000.	8000874.				
	COMM. & DATA HANDLING	7431007.	48245775.				
4	PNEUMATICS	53745.	104 10453.				
10	TEST & SUPPORT FOUTPMENT	4669540.	2070634.	-	•	,	,
11	PROGRAM MANAGEMENT	2533000.	7119000.				
· - ; ; -	SYSTEM INTEGRATION	944000.	2449699.				
17		111600.	133000			•	
14	DUALITY ACCEPTANCE	1445220.	5820000.	•		•	
15	TITAN INTERSTAGE	582000.	670000+ <u></u>				
16	* TITAN SHROUD	0.0	1000000.				
17	SHUTTLE INTERFACES	20910000.	1997000%				
18	TRAINERS & SIMULATORS	3110400.	100000				
19_	* EXPERIMENTS A & B	5000000	39000000.				<del></del>
	GROUND STATION	3251000.	800000		•		
21	* NEW COMPUTERS	4550000.		والمراجعة			
				<b>.</b>			
	LAUNCH OPERATIONS	0.0	22500000.				
22		0.0	10000000	•			
	* LV-SHUTTLE -	0.0	4950000				
24. 25	* -FACILITIES	, 134701,2	362826.	,	. ,		
	* SHUTTLE UPDATE FEIGHT	0.0	150000000	and the second section of the s	· <del></del>	-	
	* EXPCRIMENT UPDATE	0.0	39000000				
	**G.S.F.C. & OTHER	0.0	60000000.		<del></del>		٠
,	. चन्द्रका कथाक क भागाति (क				,	, t	`,
29	OPSITAL OPERATIONS			9000000	,		•
** *	G & A CHARGEABLE	92304512.	227180288				
	GGA	11907277.	29306240.	1160999.		V	
_	SUBTOTAL	104211776+	256486528.	· · · · · · · · · · · · · · · · · · ·			
	NON-G & A SUBTOTAL	14197012.	194863680.				
	TOTAL	118408784.	451350015.	10160999			
	*NO G & A CHARGE		•	•	•		
			TOTAL	579919616.		····	
	COST OF ADDIL SHUTTLE REPAIR FL	TS		0.0	•		
	GRAND TOTAL			57,9919616.			
	NO. OF FAILURES 6.34		•	-			
						4	
	UPTIME (YEARS) 12.68		<del></del>				

PERCOM PROGRAM PROGRAM NO.69 SHUTTLE SCHEDULE DELAY... 3.0 TOTAL SYSTEM MITF.... 24.0 VAR. SUBSYSTEM SLOPE.... 1.25 SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED NON-RECURRING RECURRING OPERATIONS 20150000. 30649216. 175000000 ENGINEERING 3 _ STABILIZATION _ ___ 2694125. 71585056. 21200004 2910971. THERMAL 2721483. S SHC MECHANISMS 3520000. 1278944. 32278160. 6 FLECTRIC POWER 3300000. 9000979. * PRIMARY OPTICS 44245776. A COMM. & DATA HANDLING 74 31 007 4 104 1045 1. 53735. PHEUMATICS 2070634-4669540. TEST & SUPPORT EQUIPMENT 10 2533000. 7119000. PROGRAM MANAGEMENT 2448698+ 944000. 12 SYSTEM INTEGRATION 133800. RELIABILITY 111600. 5020000. 1445220. QUALITY ACCEPTANCE 670000. 15___TITAN INTERSTAGE 582000. 1000000. 0.0 16 # TITAN SHROUD 17 SHUTTLE INTERFACES__ 1997000. 20910000.... 1000000 18 TRAINERS & SIMULATORS 3110400. 390000000 50000000 19 * EXPERIMENTS A & B .000000 3251000. 20 GROUND STATION 21 * NEW COMPUTERS 45500000 LAUNCH OPERATIONS 0.0 225000000 100000000 23__*_LV~SHUTTLE 0.0 49500000 S-C SUPPORT 362426. 25 * FACILITIES 1347012. 150000000. 0.0 26 * SHUTTLE UPDATE FLIGHT 390000000. 27 * EXPERIMENT UPDATE 0.0 600000000 28 * G.S.F.C. & OTHER ORBITAL OPERATIONS 9000000. G & A CHARGEAULE 92304512. 227140288. 1160999 11907277. 29306240. G & A 104211776. 2564 86528. SUBTOTAL 194863680. 14197012. NON-G & A SUBTOTAL 451350016. 10160999. TOTAL 11840B784. *NO G & A CHARGE 579919616. TOTAL 0.0 COST OF ADD'L SHUTTLE REPAIR FLTS 579919616. GRAND TOTAL NO. OF FAILURES.... 5.22 UPTIME RATIO 0.83

UPTIME RATIO.....

	PERCOM PRO	GRAM		•	, , , , , , , , , , , , , , , , , , , ,
	PROGRAM N	n - 74			
•	PROGRAM O				4 <u>1-2</u>
the state of the s			•		t
, , , , , , , , , , , , , , , , , , ,	, 1 # ·				,
TOTAL SYSTEM WITE 36.0					
VARSUBSYSTEM_SLDDE1.25	the state of the s		4	_	
		••••••			
SHUTTLE-MAINTAINED PROGRAM	NON DECUEDING	RECURRING	OPERATIONS		
(3 SPACECPART)-NOT OPTIMIZED	NON-RECORRING	C MECOKKING			
4	20150000	30649216.			
1 STRUCTURE 2 ENGINEERING	17500000.	2250126.	-		
3 . STABILIZATION	5367671.	142623296.			
4 THERMAL	2120000.	2910971.			
S S-C MECHANISMS	3520000.	2721493.			Q 4.24 £
א בורכזמוכ מחארם	2548120.	64709792	t		
7 * PRIMARY DOTICS	3100000		and the second section of the second section of the second		
A CHMM. & DATA HANDLING	14805196.	20791104	•		•
-9 PNEUMATICS	107058. 4669540.	20776 14.	the second section of the second section is the second section of the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the section is the second section in the section is the second section in the second section in the section is the second section in the section is the second section in the section is the section in the section in the section is the section in the section is the section in the		
10 TEST & SUPPORT EQUIPMENT	2533000.	71190000	·		
11 PROGRAM MANAGEMENT	944000.	2448698.		•	•
12 SYSTEM INTEGRATION	111600.	133800			
13 RELIABILITY 14 QUALITY ACCEPTANCE	1445220.	5820000.		•	
IS TITAN INTERSTAGE	582000	670000.	4		<u></u>
16 * TITAN SHROUD	0.0	1000000			
17 SHUTTLE INTERFACES	209 10000 •	1997000		,	
18 TRAINERS & SIMULATORS	3110400.	1.00000.			
10 # EXPERIMENTS A & B	5000000.	39000000• 			
20 GROUND STATION	3251000.	0.0			
21 * NEW COMPUTERS	4550000+				—
LAUNCH OPERATIONS		.,			
22 # LV-TITAN	0.0	22500000.	•		
23 # LV-SHUTTLE	0.0	10000000			
24 S-C SUPPORT	. 0.0	4950000• 362826•		•	
25 * FACILITIES .	1347012+	150000000			* -
26 * SHUTTLE UPDATE FLIGHT	0.0	39000000.			
27 * EXPERIMENT UPDATE	0.0	60000000.		•	
28 * G.S.F.C. & OTHER					
29 DESITAL OPERATIONS			9000000		1
G & A CHARGEAGLE	103674752.	388476416.	1160999		
	13374037•	50113424+	- II 9033A*		
SUBTOTAL	117048784.	438589696			
NON-G & Á SÚBŤOŤÁL	14197012	194863680.	10160999		
TOTAL	131245792.				
*NO G & A CHARGE		TOTAL	774859776.		
COST OF ADD'L SHUTTLE REPAIR		, = ··· = ,	0.0		
GRAND TOTAL	- <del></del>		774859776.		
NO. OF FAILURES 4.54					
UPTIME (YEARS) 13.62		•			

PERCOM PROGRAM PROGRAM NO.76 SHUTTLE SCHEDULE DELAY.. 2.0 TOTAL SYSTEM MITE ..... 36.0 VAR. SURSYSTEM_SLOPE.... 1.25 SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED NON-RECURRING RECURRING STRUCTURE 20150000. ENGINFERING 175000000 __ STABILIZATION 5367671. 14262 1296. 21200000 2910971 THERMAL SHC MECHANISMS 35200000. 2721483. ELECTRIC POWER 2548120. 64309792 B000B78. 7 * POIMARY OPTICS 3300000. COMM. & DATA HANDLING 14805196. 96122672. 107058. PNEUMATICS 20781104. TEST 6 SUPPORT EQUIPMENT 4669540. 20 706 34. PROGRAM MANAGEMENT 2533000. 7119000. SYSTEM INTEGRATION 944000. 2448698. RELIABILITY 111500. 133800. 14 QUALITY ACCEPTANCE 5820000. 1445220. 15 TITAN INTERSTAGE 16 * TITAN SHROUD 582000. 670000. 0.0 10000000 17___ SHUTTLE INTERFACES 20910000. 1997000. TRAINERS & SIMULATORS 3110400. ~~ 50000000. 19 # EXPERTMENTS A & B 390000000 (2)3251000. 8000000 20 GROUND STATION 45500000. PI __ # NEW COMPUTERS LAUNCH OPERATIONS LV-TITAN 0.0 225000000. LV-SHUTTLE 0.0 100000000 S-C SUPPORT 0.0 49500000 FACILITIES 1347012. 362826. 24 * SHUTTLE UPDATE FETGHT 150000000 0.0 27 * EXPERIMENT UPDATE 0.0 390000000. 24 * G.S.F.C. & OTHER 600000000 29 ORBITAL OPERATIONS 7000000<u>-</u> 388475416. G & A CHARGEABLE 103674752. 1160999. GEA 13374037. 50113474. SUBTOTAL 117048784. 438589696. NON-G & A SURTOTĀL 14197012. 194863680. 637453312. TOTAL 131245792. *NO G & A CHARGE TOTAL 774859776. COST OF ADD'L SHUTTLE REPAIR FLTS GRAND TOTAL NO. OF FAILURES. ... 4.42 UPTIME (YEARS).... 13.26 pmg /me = = =

UPTIME RATIO

•	PRIIGRAM	NO.77		
प निष्याचन कार्याच्या कर अपना अन्तर्भाव के स्थापन की निष्याचन की		***	St. as papering at the state of	an tao to the high staff smooth state waspertuningsbackwise passaring of
SHUTTLE SCHEDULE DELAY 2.5				
TOTAL SYSTEM MITE 36.0				
VAR. SURSYSTEM SLEEPE 1.25				•
•				
***********	************		**********	
SHUTTLE-MAINTAINLD PROGRAM				
(3 SPACECRAFT)-HUT UPTIMIZED	NON-RECURRING	. RECURRING.	OPERATIONS	w
*******************	******	<b></b>		
1 STRUCTURE				
? FNGINEERING	17500000.	2250126.		•
3 STABLLIZATION		142623296		
4 THERMAL	2120000.	2910971-		
S-C MECHANISMS		2721483.	-	
6 FLECTRIC POWER	2548120	64709792.	•	* * * * * * * * * * * * * * * * * * * *
7 _ * PRIMARY OPTICS				
B COMM. & DATA HANDLING	14905196.	96122672.		•
9 PHEHMATICS	107058.	20781104.		
10 TEST & SUPPORT FOULPHENT	4669540.	2070614.		
11 PROGRAM MANAGEMENT	25 13000	7119900		
12 SYSTEM INTEGRATION	944000.	2448698.		•
_13RELIABILITY	111600	137A00		
14 BUALITY ACCEPTANCE	1445220.	5920000 <b>.</b>		
15TITAN INTERSTAGE	582000.	670000.		,
15 * TITAM SHRRUD	, 0.0	1000000.		
17 SHUTTLE INTERFACES	20910000.	1997000		
18 TRAINERS & SIMULATORS	3110400.	100000.		
19 . EXPERIMENTS A E A	5000000.	390000000		
20 GROUND STATION	3251000.	800000.		
21 . NEW COMPUTERS	4550000.	0.0		
		•		
CAUNCH OPFRATIONS		·		
22 + LV-TITAN	0 • 0	22500000.		
23 * LV-SHUTTLE	0.0	10000000		
24. S-C SUPPORT	0.0	4950000.		
25 * FACILITIES	1347012.	362826.		
26 * SHUTTLE UPDATE FLIGHT	0.0	~ 150000000		• •
27 * EXPERIMENT UPDATE	0.0	39000000		
28 * G.S.F.C. & OTHER	0.0	60000000.		
20				
29 TROITAL OPERATIONS			7000000.	
G & A CHARGEARLE	103674752.	389476416		
G & A	13374037.	50113424.	11 60999•	•
SUPTOTAL NON-C 6 4 CURTOTAL	117048784.	438589696		
NON-G & A SUBTOTAL	14197012.	194963690.		
*ND G & A CHAPGE	131245792.	633453312.	1 01 60999.	
THU G & A CHARGE		TOTAL	*******	
COST OF ADDIL SHUTTLE REPAIR FLY		TOTAL	774859776.	
	a a		0.0	
GRAND TOTAL			774859776	
NO. OF FAILURES 4.36				
UPTIME (YEARS) 13.09				

			10.70		- K	
		PROGRAM N	4U <b>€ 7 C</b> )	dy name Polit All at gaze of agricum the back and Mag		
SHUTTLE SCHEDUL	E DELAY 3.0			•		
TOTAL SYSTEM MT						
VAR. SUBSYSTEM	SL_00E • • • t • 25					
SHUTTLE-MAINTA		• • • • • • • • • • • • • • • • • • • •	••••••••••••	• • • • • • • • • • • • • • • • • • • •	A 251-70-70-70-70-70-70-70-70-70-70-70-70-70-	
	-NOT DETIMIZED	NON-RECURRING	RECURRING	DPERATIONS		
400000000000000000000000000000000000000						
1STRUCTUR	E	-1"20150000.	30649216.		1	
P ENGINEED	ING	17500000.	2250126.			
_ 3 STABILIZ	ATION	5367671.	142623296.			
4 THERMAL		2120000.	2910971.			
_ 5S-C MFCH		3520000.	2721483.			
	OUMEK	2548120.	64309792.	•	<i>p</i> •	
7 * PPTHARY			8000873			
	DATA HANDLING	14805196.	96122672.			
- 9 PHEUMATT		107058.	20781104.			
	JPPORT EQUIPMENT	4667540.	2070634.			
	MANAGEMENT	2533000.	7119000.			
	NTEGRATION	944000.	. 2449699.		•	
_13RFLIABIL	·	111600.	1 17800 •			
	ACCEPTANCE	1445720.	5820000.			
. 15 _ TITAN IN		582000.				
16 * TITAN SH		9.0	1000000.			
17 SHUTTLE	TOS & SIMULATORS	20910000 • 3110400 •	1997000.			
19 * EXPERIME		5000000	39000000.			
20 GROUND S		3251000.	800000		· · · · · · · · · · · · · · · · · · ·	
21_ * NEW COM		4550000.	0.0			
						· <u>·</u> /
LAUNCH OPE	RATIONS					
22 * LV-T1	* ************************************	0.0	22500000.			
21_#LV-SH	リエエレビ	0.0	10000000.			
24 S-C S	Դեռսե <u>դ</u>	0.0	49500004		-,	
25 * FACIL	ITIFS	1347012.	362826.			
์ 26 ีื # รหบาไยย เ	POATE FLIGHT .	0.0	15000000.			
Z7 * EXPERIME	NT UPDATE	0.0	39000000.			
ิลล ิ* G.S.F.C.	& OTHER	0.0	60000000		•	
PO ORBITA				9000000	•	
G & A CHAPE	FAREF - "	103674752.	388476416+			
G & A		13374037.	50113424.	1160999.		
SUBTOTAL	THE TOTAL	117048764. 14197012.	438589696. 194863680.	·		
NON-G & A	OUG DIT AL		19446 30H0+ 633453312+	1.01.60.000		
*NO G & A (	HARGE	131245792.	0134317124	10160999•		
T A & D UMF	SHAMOC	, , , Y	OTAL	774859776*		
	O'L SHUTTLE ŘEPATŘ FL	·řs '	41.1.194	0.0		
GRAND TOTAL		# 1 LF		774859776.		
STREET, LOUIS	URES 4.31					

				1 (1
	PROGRAM I	NO.79	-	,
SHUTTLE SCHEDULE DELAY 6.0				
TOTAL SYSTEM MITE 36.0				
VAR. SUBSYSTEM SLOPE 1.25		-		
•				
	*****	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
SHUTTLE-MAINTAINED PROGRAM (3 SPACECPAFT)-NOT OPTIMIZED	NON-RECURRING	RECURBING	OPERATIONS	
				b
1 STRUCTURE	20150000	30649216.		
, 2 ENGINEERING	17500000+	2250126.		-
3STABILIZATION	5367671.	142623296+		
4 THCOMAL	2120000.	2710771+		
5 S-C MECHANISMS	3520000•	2721491.		
6 ELECTRIC POWER	2548120.	64309792		
7 * PRIMARY OPTICS	3300000.	8000A78.		
B COMM. & DAYA HANDLING	14805196. 1	46122672		•
PNEUMATICS	, 107058	20781104+		
10 TEST & SUPPORT EQUIPMENT	4669540.	2070634.		•
11 PROGRAM MANAGEMENT	25 33000 •			
12 SYSTEM INTEGRATION	944000.	2448698		•
13 RELIABILITY  14 OUALITY ACCEPTANCE	111600•	133800		
15 TITAN INTERSTAGE	1445220.	5820000.	•	
16 * TITAN SHOOUD	582000+	670000		
17SHUTTLE INTERFACES	0.0	1000000. 1997000.		
18 TRAINERS & SIMULATORS	3110400.	100000		***************************************
10 & EXPERIMENTS A & B	5000000.	39000000.		
29 GROUND STAFLON	7251000.	B00000.		
SI * NEW COMBITERS	4550000.			
				•
LAUNCH OPERATIONS	· · · · · · · · · · · · · · · · · · ·	***************************************		
22 * LV-TITAN	0.0	22500000.		
27 * EV-SHUTTI C		10000000.		
24 S-C 99PP9RT	0.0	4750000.		
25 * FACILITIES	1347012.	362A26		
26 * SHUTTLE UPDATE FLIGHT	0.0	150000000		
27 * EXPERIMENT UPDATE 28 * G.S.F.C. & OTHER				
ZH + U+3+F+C+ D UINER	0.0	60000000.		
29 ORBITAL OPERATIONS		······································	9000000	
G & A CHARGEABLE	103674752.	388476416		
G E A	13374037.	50113424.	t160999.	
SUBTOTAL	117048784.			
NON-G & A SUBTOTAL	14197012.	194863680.		
TOTAL	131245792.	633453312•	10160999•	
*NO G & A CHARGE	•	OTAL	774850774	•
COST OF ADD'L SHUTTLE REPAIR FL	TS T	UTAL,	774859776. 0.0	
GRAND TOTAL			774859776.	
NO. DE FAILURES 4.00				
UPTIME (YEARS) 12.00		_		

PERCOM PROGRAM PROGRAM NO.71 TOTAL SYSTEM MITTE .... 24.0 VAD. SUBSYSTEM SLOPE...... 1.25. SHUTTLE-MAINTAINED PROGRAM ___NON-RECURRING DPFRATIONS ... RECURRENG (3 SPACE (PAFT)-NOT ORTIMIZED 0150000 ENGINEERING 75000000 2250126. 3 _ STABILIZATION 71585056. 2694125. 2910971. THERMAL 2120000. 35200000 2721483. S-C MECHANISMS 32278160. ELECTRIC POWER 1278744. 7 #_PRIMARY OPTICS H000878. 33000000 48245776. COMM. & DATA HANDLING 74 51007. 10430453 43735 PHEUMATICS 4669540. 20706 14. TEST & SUPPORT EQUIPMENT 11___ PROGRAM MANAGEMENT 25 13000 7119090. 2448698. SYSTEM INTEGRATION 944000. PELIABILITY ..... 133400-111600. 14 QUALITY ACCEPTANCE 1445220. 5820000. 670000. 582000. 15 TITAN INTERSTAGE 10000000 16 * TITAN SHPOUD 0.0 20910000. 19970000 17 ___SHUTTLE INTERFACES_ 100000. TRAINERS & SIMULATORS 3110400. *0000000* 50000000. 10 # EXPERIMENTS A & 8 3251000. 800000. GROUND STATION 0.0 21_# NEW COMPUTERS 45500000 LAUNCH OPERATIONS 0.0 22500000. 22 * LV-TTTAN 21__ * ___ LV-SHUTTLE_ 100000000. 0.0 49500000 SHC SUPPORT 0.0 362826. 25 * FACILITIES 1347012. 150000000. 0.0 26 * SHUTTLE UPDATE FLIGHT 27 * EXPERIMENT UPDATE 390000000. 0.0 0.0 60000000 28 * G.S.F.C. & OTHER ORBITAL OPERATIONS 9000000. 92304512. 227180288. G & A CHAPGEABLE 1160799. 29306240. 11907277. GEA 104211776. 256486528 SUBTOTAL 194863690. NON-G & A SUBTOTAL 14197012. 10160999 TOTAL 118408784. 451350016. **♦NO G & A CHAPGE** TOTAL 579919616. COST OF ADD'L SHUTTLE REPAIR FLTS 579919616. GRAND TOTAL NO. OF FAILURES.... 4.67 UPTIME (YEARS) ..... 9.33

(A)

UPTIME RATIO

PERCOM PROGRAM PROGRAM NO.72 SHUTTLE SCHEDULF DELAY.. 24.0 TOTAL SYSTEM MITF..... 24.0 VAR. SURSYSTEM SLOPE.... 1.25 SHUTTLE-MAINTAINED PROGRAM NON-RECURRING ___ RECURRING ___ **OPERATIONS** (3 SPACECRAFT)-NOT OPTIMIZED 20150000. ENGINEERING 175000000+ 2250126. STABLETATION 2694125. 71505056. 2120000-2910971. THERMAL S-C MECHANISMS 2721483. 3520000. FLECTRIC POWER 1278944. 32278160. 3300000. 8000878. 7 * PRIMARY OPTICS COUM. & DATA HANDLING 7431007. 48245776. 53735. 10430453. PNEUMATICS 10 TEST & SUPPORT EQUIPMENT 4669540. 2070634. PROGRAM MANAGEMENT 2533000. 7119000. SYSTEM INTEGRATION 944000. 2448698 12 13 PELIABILITY 111600+ 1 33400. 58200004 14 QUALITY ACCEPTANCE 1445220 . 15 TITAN INTERSTAGE 670000. 582000. 16 * TITAN SHROUD 0.0 10000000. 17 SHUTTLE INTERFACES 209100000. 1997000. 100000+ 18 TRAINERS & SIMULATORS 3110400. 19 # FXPERIMENTS A & B 50000000 19000000 8000000 20 GROUND STATION 3251000. 21 * NEW COMPUTERS. 45500000 LAUNCH OPERATIONS 0.0 225000000 22 * LV-TITAN 23__ *___ LV-SHUTTLE 0.0 100000000.... 49590000. 24 S-C SUPPRIET 0.0 362826. 1347012. 25 # FACILITIES 0.0 150000000. 26 * SHUTTLE UPDATE FLIGHT 390000000 " 27 * EXPERIMENT UPDATE 0.0 "28" * G.S.F.C. & OTHER 600000000 0..0 29 OPRITAL OPERATIONS 9000000. 92304512. 227180288. G & A CHAPGEABLE 1160999. 11907277. 29306240. GEA 104211776. 256486528. SUBTOTAL 14197012. 194863680. NON-G & A SUSTOTAL 118408784. 451350016. 10160999. TOTAL *NO G & A CHAPGE ____TOTAL 579919616. COST OF ADD'L SHUTTLE REPAIR FLTS 0.0 579919616. GRAND TOTAL NO. OF FAILURES. ... 3.50 UPTIME (YEARS) .... 7.00 UPTIME RATIO..... 0.47

*	PROGRAM	NO.80		·		~
•	(-10000000)			·		
		•		v		,
SHUTTLE SCHEDULE DELAY 12.0 TOTAL SYSTEM MYTE 36.0					*	
VAR - SURSYSTEM SLOPE 1 - 25						
•						
SHUTTLE-MAINTAINED PROGRAM		•••••	***			
(3 SPACECRAFY)-NOT OPTIMIZEO	NON-RECURRING	RECURRING	OPERATIONS			
		• • • • • • • • • • • • • • • • • • • •	******			, 7
1 STRUCTURE	20150000.	30649216			<del></del>	
2 ENGINEERING	17500000.	2250126.			* , '	
T. STABILIZATION	5367671.	142623296.				
4 THERMAL	2120000.	2910971.		•	•	
S SHC MECHANISMS	3520000.	2721483.		A-4-4		
"6" EKECTRIC POWER	2548120.	64309792.	•			'-
7 7 * PRIMARY OPTICS The Total of	** 3300000 <u>-*</u>		**	*	<u> </u>	
9 COMM. & DATA HANDLING	14805196.	96122672.	Ť	' ^. ·		
9 PNFIJMATTCS	107058.	20781104.	maga para mana manangan manangan (manangan mengan)	/ [^] ~~	· · · · · · · · · · · · · · · · · · ·	
10 TEST & SUPPOPT EQUIPMENT	4669540+	\$0.704.14	•	/ 🗻 ?	,	
11 - PROGRÁM MANAGÉMENT	25 1 100 0 ·	7119000.	-	\$ /		
12 SYSTEM INTEGRATION	944000.	2448699•		/ >/		•
13 - RELIABILITY	111600.	1.33900.	<u> </u>	ON THE STATE OF TH		
14 QUALITY ACCEPTANCE	1445220.	5820000.		`\ <b>\</b> '		
15 TITAN INTERSTAGE	582000.	670000.	/	~		
16 # TITAN SHROUD	0.0	1000000*	/ ~	<b>9</b> 7,1		
17 SHUTTLE INTERFACES	20910000.	1997000		<u>کے ۔۔۔۔۔۔</u>		
IN TRAINERS & SIMULATORS	3110400.	100000+	/ 🔊	/		
19 * EXPERIMENTS A & B	5000000	<b></b>				
20 GROUND STATION	3251000.	800000.	( 7,			
21 * NEW COMPUTERS	4550000	0.0			<del>~~~~~~</del>	
	-					
LAUNCH OPERATIONS					<u>, , , , , , , , , , , , , , , , , , , </u>	
22 * LV-TITAN	0.0	22500000.	•			
23 * LV-SHUTTLE	0.0	10000000				
24. S-C SUPPORT	. 0.0	4950000.				
25 * FACILITIES	1347012+	362826				
26 * SHUTTLE UPDATE FLIGHT	0.0	15000100.	•			
. 27 * EXPERIMENT CUPDATE 8	0.0	39000000	· · · · · · · · · · · · · · · · · · ·	5.5		
28 * G.S.F.C. & STHER	0.0	60000000	• •	· • •		4
29 DRBITAL OPERATIONS			9000000			
G & A CHARGEABLE	1036747526	ЗЯВ476416				
G & A	13374037.	50113424	1160999.		•	
SUBTOTAL.	117048784.	438589696				
NON-G & A SUBTOTAL	14197012.	194863680.				
TOTAL	131245792.	633453312.	10160999			
*NO G & A CHARGE		<del></del>				,
		TOTAL	774859776.	, ,		
COST OF ADD'L SHUTTLE REPAIR FLT	S		0.0	•		
GRAND TOTAL		~	774859776		4	
		the state of the s	•			
NO. OF FAILURES 3.50						

-	A THE PARTY OF THE	PERCOM PR	OGRAM		
		PROGRAM	NO.AI		,
				manufacture of the state of the	
	_SHUTTLE SCHEDULF DELAY 2440 TOTAL SYSTEM MTTF 36.0				
	VAR. SUBSYSTEM SUPPE 1.25				
		2,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	**************		
	SHUTTLE-MAINTAINED PROGRAM (3 SPACECRAFT)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS	
					-
	1STRUCTURE		30649216		
	2 ENGINEERING	17500000.	2250126.	•	•
_	3 STABILIZATION		2910971*		
	4 THERMAL 5 S-C MECHANISMS'	2120000. 3520000.			
	A ELECTRIC POWER	2548120	54309792.		
	7 # PRIMARY OPTICS	3300000	8000078		
_	8 COMM. & DATA HANDLING	14805196.	96122672.	•	
	9 PHEUMATICS	107058•	20781104		
	10 TEST & SUPPORT FOUTPMENT	4669540.	2070634.		
_	11 PROGRAM MANAGEMENT	25 13000	7119000		
	12 SYSTEM INTEGRATION	944000.	, 2448698+		•
	13RCLIABILITY	111600.	133600. 5820000.		
	14 QUALITY ACCEPTANCE	1445220. 582000.	670000*		
+-	15 * TITAN INTERSTAGE	582000•	1000000.		•
	17 SHUTTLE INTERFACES	20910000+	1997000.		
	18 TRAINERS & SIMULATORS	3110400.	100000.		
	19 * EXPERIMENTS A. & B	5000000.	39000000		
	20 GUOUND STATION	3251000.	800000.		
_	21 * NEW COMPUTERS	4550000			
-	LAUNCH OPERATIONS	0.0	22500000.		
	22 4 LV-Y!YAN	0.0	100000000		
-		0.0	4950000		
		1347012.	362826.		
	26 * SHUTTLE UPDATE FLIGHT	0.0	15000000	1	
	27 * EXPERIMENT UPDATE	n.o	39090000 •		
	28 * G.S.F.C. & OTHER	0 • 0	#0000000•		
	29 ORBITAL OPERATIONS			900000.	
	29 ORBITAL OPERATIONS G & A CHARGEABLE	103674752	388476416.		
	G & A	13374037.	50113424.	11609994	
	SURTOTAL	117048784.	438589696		
	NON-G & A SURTOTAL	14197012.	194863680.		
	TOTAL	131245792.	633453312.	10160999.	
	*NO G & A CHAPGE	•		********	
			TOTAL	774859776.	
	COST OF ADD'L SHUTTLE REPAIR FLI	5		0.0 774859776.	
	GRAND TOTAL  NO. OF FAILURES 2.80		· me 4	TENNISSET SE SAME SAME	
	SAIDS THE CHILD CONTRACTOR STREET STREET		• •		

	PROGRAM			
W V W V V V V V V V V V V V V V V V V V	PRIJORANI	NU+02		
SHUTTLE SCHEDULF DELAY 0.5				
TOTAL SYSTEM MITE 48.0			the second and in the second-second terms	
VARSURSYSTEM_SLOPE1.25	<del></del>	معاملتها بناء أحداث والمناجع والمناجع المناطعة المناطعة		**************************************
		• • • • • • • • • • • • • • • • • • • •		
SHUTTLE-MAINTAINED PROGRAM	er mi kai mi	,	— were the latter of the contract of the contr	
(3 SPACECRAFT)-NOT OPTIMIZED	NON-PECUPRING	RECURRING	OPERATIONS	•
1 STRUCTURE	20150000.	30649216.		• •
2 FNGTHERING	17500000.	2250126.		
3 STABILIZATION		227517872.		
4 THERMAL	2120000.	2910971.		
S S-C MECHANISMS	3520000.	2721483.		<b>.</b> •
5 ELECTRIC POWER	4064853.	102589312.	**************************************	
7 PRIMARY OFFICS	3300000.	8000878		
R COMM. & DATA HANDLING	236176484	153337520.		
9 PNEUMATICS	170783.	31150704		•
10 TEST & SUPPORT COULPMENT	4669540.	2070634.	•	
PROGRAM WANAGEMENT	2531000.	7119000.		
12 SYSTEM INTEGRATION 13 PELIABILITY	944000.	2448699.		•
14 QUALITY ACCEPTANCE	111600.	133900		
15 TITAN INTERSTAGE	1445220. 582000.	5820000.		
16 * TITAN SHROUD	0.0	670000.		
17 SHUTTLE INTERFACES	20910000.	1000000. 1997000.		
18 TRAINERS & STMULATORS	3110400.	100000.		<del></del>
19 * EXPERIMENTS A 6 8	5000000	39000000.		
20 GROUND STATION	3251000.	800000		
21 * NEW COMPUTERS	4550000	0.0		
LAUNCH OPERATIONS				
22 * LV-TITAN	0.0	22500000.		
23 * LV-SHUTTEE	0.0	10000000		
24 S-C SUPPORT	0.0	4950000.		
25 * FACILITIES	1347012.	362826.		
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000.	-	····
27 * EXPERIMENT UPDATE	0.0	39000000.		
28 * G.S.F.C. & STHER	0.0	60000000.	- to - to - to - to - to -	
29 ORBITAL OPERATIONS			900000.	<del></del>
G & A CHARGEARLE	117262704.	591234608.	,,,,,,,,,,	
GEA	15126882.	74979232	1160999.	***************************************
ŚURTOTAL	132389584.	656213760.	30.00.04	
NON-G & A SUBTOTAL	14197012.	194963690.		
TOTAL	146586592•	851077376.	10160999.	
*NO G & A CHARGE				
	T	OTAL	1007824640.	
COST OF ADDIL SHUTTLE REPAIR FE	_TS		0.0	
GRAND TOTAL NO. OF FAILURES 3.46			1,007824640.	

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The second of th					
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the transfer to the transfer that the transfer of the transfer	PERCOM PRO	GRAM		<b>'</b> . <b>'</b>	, , , , , , , , , , , , , , , , , , , ,
			سین بیان با بیان با بیان با بیان بازد. مو		
•	PROGRAM N	U4N3			<u></u>
The second secon			•	•	
SHUTTLE SCHEDULE DELAY 1.0			سري منسون ي سيده ي سويد		
TOTAL SYSTEM MITE 49.0			•		
VARSURSYSTEM_SLOPE 1.25					
		,,			,
SHUTTLE-MAINTAINED PROGRAM	•		0000 4 T 1 DMC		
(3 SPACÉCRAFY)-NOT OPTIMITED	NON-RECURRING	RECURRING	GPERATIONS		***
	*************	30649216			
1 STRUCTURE	20150000+	2250126.			•
P FNGINEERING	8562705	227517872.			
3 STABILIZATION	2120000 -	2910971.	•		
5 -S-C MECHANISMS	3520000.	2721481	بيعها يتستن مريس مريستان		
6 ELECTRIC POWER	4064853+	102599112+ 8000878+	•	•	
7 * PRIMARY DETICS	3300000 •	1533 17520.			
A COMM. & DATA HANDLING	170783.	33150784			
10 TEST & SUPPORT EQUIPMENT	4669540	2070614		,	
MANAGER AND	2533000+	7119000.		<del></del>	
12 SYSTEM INTEGRATION	944000+	2448698.			•
13 RELIAPILITY	111600	133900			
14 QUALITY ACCEPTANCE	1445220.	5870000. 670000.			•
15 TITAN INTERSTAGE	582000 0.0	1000000.			•
16 * TITAN SHROUD	20910000.	1997000+			
17 SHUTTLE INTERFACES TRAINERS & SIMULATORS	3110400.	100000-			
19 . * EXPERIMENTS A C B	5000000•	39000000			
20 GROUND STATION -	3251000.	#00000 0.0		·	
21_* NEW COMPUTERS	4550000.				
A ALIANGU ADERATIONE	-				
LAUNCH OPERATIONS	0.0	225000000	•		
23 * LV-SHUTTLE .	0.0	10000000			
24. S-C SUPPORT	. 0.0	4950000• 362826•	T	** •	
25 * FACILITIES	1347012+	15000000.			
24 * SHUTTLE UPDATE FLIGHT	0.0	39000000			
27 * EXPERIMENT UPDATE	0.0	60000000	, , , , , , , , , , , , , , , , , , ,		
28 * G.S.F.C. & RTHER				<del></del>	
29 DRAITAL OPERATIONS		## # # # # # # # # # # # # # # # # # #	9000000		
G & A CHARGFABLE	117262704.	581234688 74979232.	1160999•	***************************************	<del></del>
G & A	15126882 • 132389584 •	656213760.			
SUBTOTAL	14197012.	194863680.			
NON-G & A SUBTOTAL TOTAL	146586592+	851077376	10160999.	<del>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</del>	
* NO G & A CHARGE		· · · · · · · · · · · · · · · · · · ·	1 667036444-		
		TOTALL	1007824640	_1,	
COST OF ADDIL SHUTTLE REPAIR FLT	S	•	1007824640.		
GRAND TOTAL					
NO. OF FAILURES 3.43		·		·	
UPTIME (YEARS) 13.71	وبدائي والمساور والاستهام والماباغ والمابد الم والمساور والم			,	
Obline Mainessess asi	• •	* * -	•		

		PERCOM PRO	GOAN		- t	
		PERCOM PRO	GRAM	( ************************************		( )
···		PROGRAM N	D • 84			
	Approximate at a section of experience of ex					
r						
	FEM MTTF 48.0 FSTEM SLOPF 1.25					
	LOICH JONES OF THE PARTY OF A	<del></del>				•
		·······		****************		
	MAINTAINED PROGRAM		necuontus '	ODEOATIONS		
· ·	CPART)-NOT OPTIMIZED	NON-RECURRING	_ RECORRING	OPFRATIONS	<del></del>	
	RUCTURE	20150000	30649216.			•
2EN	SINEEDING	17500000.	2250126.			,
	ABIL IZATION	8562705.	227517872.			
4 THE	FRMAL	2120000.	2910971.			-
5 5-0	MECHANISMS	3520000•	2721483.			
	CIBIC BUMES	4064853.	102589312.	•		* #4
	IMARY OFFICS	3300000.	9000978. 153137520.			
*	MM. 6 DATA HANDLING	23617648. 170783.	33150784.		•	ı
	ST & SUPPORT EQUIPMENT	4669540.	2070634			
-	DORAM MANAGEMENT	2533000.	7119000.			
	STEM INTEGRATION	944000.	2448698			-
13 RF	TABILITY	111600.	1 13800.	·		
14 00/	ALITY ACCUPTANCE	1445220.	5920000•			
15T!	TAN INTERSTAGE	582000.				
	TAN SHROUD	0.0	1000000.			
	JITLE INTERFACES	20910000	1977000			
•	TRAINERS & SIMULATORS	3110400. 5000000.	100000.			,
	PERIMENTS A & 9	3251000.	800000			
	TW COMPUTERS	4550000	0.0			
LAUN	CH OPERATIONS					
		0.0	22500000.			
	LV-SHUTTLE		100000000			
24	S-C SUPPORT	0.0	4950000 <b>.</b> 362826 <b>.</b>			
25 *	FACILITIES JITTLE UPDATE FLIGHT	1347012.	1.5000000			
	PERIMENT UPDATE	0.0	39000000.			
	S.F.C. & NYHER	0.0	60000000			
	ORBITAL OPERATIONS			9000000		· · · · · · · · · · · · · · · · · · ·
	A CHARGEABLE	117262704.	501234688.	1160999•		
		15126882.	74979232.	1160999		
SUBT		132389584	656213760.			
иоч-0	S & A SUBTOTAL	14197012.	194863690.			
TOTAL	_	146586592.	851077376•	10160999•		
*NO (	S & A CHARGE		TOTAL	1007824640.		
" "" CDST	OF ADDIL SHUTTLE REPAIR FLTS		f =====	0.0		
	TOTAL			1007824640.		
ND.	DE FATLURES 3.39					
UPTI	MC (YEARS) 13.58		·		<u> </u>	
UPTI	ME DATID 0.91		, , '			

( - v PERCOM PROGRAM PROGRAM NO.85 SHUTTLE SCHEDULE DELAY. . 2.0 TOTAL SYSTEM MITE..... 48.0 SHUTTLE-MAINTAINED PROGRAM NON-RECURRING RECURRING 20150000. 30649216. 175000000 2250126. ENGINEERING STABILIZATION 8542705. 227517872. 2120000. 2910971. THERMAL S-C MECHANISMS 35200000. 2721483. ELECTRIC POWER 102589312. 4064853. * PRIMARY OFFICS 33000000 8789998 153337520. 23617648. COMM. & DATA HANDLING 170793. PHEUMATICS 33150784. 2070634. TEST & SUPPORT FOUTPMENT 4669540. 10 PROGRAM MANAGEMENT 2533000. 7119000. 11 SYSTEM INTEGRATION 944000. 2448698. 12 1 13800. RELIABILITY.... 111600. QUALITY ACCEPTANCE 58200000. 1445220. 6700004 TITAN INTERSTAGE 542000. 1000000. 16 * TITAN SHROUD 17 SHUTTLE INTERFACES 1997000. 209100000 IR TRAINERS & SIMULATORS 3110400. 390000000 19____ FXPERIMENTS A & B ____ 50000000. 3251000. 8000000 20 GROUND STATION 21 * NEW COMPUTERS 45500000 0.0 LAUNCH OPERATIONS 225000000. LV-TTTAN 100000000 . LV-SHUTTLE 4950000. 0.0 24 S-C SUPPORT 1347012. 362926. FACILITIES 0.0 150000000. 26 * SHUTTLE UPDATE FLIGHT 39000000 27 * EXPERIMENT UPDATE 0.0 600000000 28 * G.S.F.C. & OTHER 29 DRBITAL DPERATIONS 9000000. ____G & A CHARGEABLE 117262704. 581234688. 11609994 GEA 15126082. 74979232. 656213760. 132389584. SUBTOTAL 194863680. NON-G & A SUBTOTAL 14197012. 10160999. 851077376. 146586592. TOTAL *NO G & A CHARGE 1007824640. 0.0 COST OF ADD'L SHUTTLE REPAIR FLTS 1007824640. GRAND TOTAL NO. OF FAILURES.... 3.36

11

UPTIME (YEARS) .... 13.44

UPTIME RATIO.....

	PROGRAM	NO - 86		^
			proprie designation of the second section of the section of the second section of the section of	* ,
SHUTTLE SCHEDULF DELAY 2.5				, , , , , , , , , , , , , , , , , , , ,
TOTAL SYSTEM MITE 48.0			\$	•
VAR. SUDSYSTEM SLOPE 1.25				,
		• • • • • • • • • • • • • • • • • • • •	,	
SHUTTLE-MAINTAINED PROGRAM	MON OSCUDDING	DECUDATNE	COECATIONS	•
(3 SPACECRAFT)-NOT OPTIMIZED	NON-RECORDING.	HECOMPLIES		
1 STRUCTURE	20150000	30649216.		\$
2 ENGINEERING	17500000.	2250126.		
3 STABILIZATION	8562705.	227517872		
4 THEPMAL	2120000.	2910971•		-
5 S-C MECHANISMS	3520000.	2721483.		,,
A FLECTRIC POWER	4064853.	102549 112.	*	4
7 * POIMARY OPTICS	3300000			
B COMM. & DATA HANDLING	2.3617648.	154447520.		
9 PNCUMATICS	170783.	31150784 2070614.		
10 TEST 6 SUPPORT COULDMENT	4669540. 2533000.	7119000.		"CIR"
11 PROGRAM MANAGEMENT 12 SYSTEM INTEGRATION	944000.	2448698		2000
12 SYSTEM INTEGRATION 13 RELIABILITY	111600.	1 13800 •	, ,	PRO
14 QUALITY ACCEPTANCE	1445220.	5820000.	1 RE	•
15 TITAN INTERSTAGE	582000.	670000.		<u> </u>
16. * TITAN SHROUD	7.0	1000000.		PRODUCIBLE
17 SHUTTLE INTERFACES	20910000.	1997000.		
18 TRAINERS & SIMULATORS	3110400.	100000.	Ç	
19 * EXPERIMENTS A & B	5000000.			
20 GROUND STATION	3251000.	лооооо.		•
21 * NEW COMPUTERS	4550000.			
LAUNCH OPERATIONS				
22 * LV-TITAN	0.0	22500000.		
23 * LV-SHUTTLE	0.0	10000000	'	
24. S-C SUPPORT	0.0	4950000.		
25 * FACILITIES	1347012+	362826		
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000		•
27 * EXPERIMENT UPDATE	. 0.0	39000000		
28 * G.S.F.C. & OTHER	0.0	60000000.	•	•
ODDITAL COCCATIONS		<del></del>	9000000	
POPERATIONS G & A CHARGEARLE	117262704.	581234680.	*	r
G & A	151 26882.	749792324	1160999.	
SUBTOTAL	132389584.	656213760.		
NON-G & A SUBTOTAL	14197012.	194863680.		
TOTAL	146586592.	#51077376.	1 0) 60999.	· · · · · · · · · · · · · · · · · · ·
*NO G & A CHARGE			1007034640	
Commission of the Commission o			1007824640.	
COST OF ADD'L SHUTTLE REPAIR FL	13		1007824640.	
GRAND TOTAL				<del></del>

	PROGRAM	NO.87			
					<u> </u>
SHUTTLF_SCHEDULE_DFLAY++3+0					\ 
TOTAL SYSTEM MITF 48.0				•	
AR SUSSYSTEM_SLOPE 1.25					
NAME OF THE PROPERTY OF STATE	4		*		
SHUTTLE-MAINTAINED PROGRAM					
(3_SPACECRAFT)-NOT OPTIMIZED					
**************************************		30649216.			
1 STRUCTURE	17500000	2250126			
2 ENGINFERING 3 STABILIZATION				,	*
4 THERMAL	2120000.	2910971.		÷ ż	•
5 S-C MECHANISMS	3520000				
6 FLECTRIC POWER	4064853	102589312.		-	
7 * PRIMARY OPTICS		8000878.			
8 COMM. & DATA HANDLING	23617648.	153337520.		•	
9 PNEUMATICS		33150784+,		•	
10 TEST & SUPPORT EQUIPMENT	4669540.	2070634.			*
11 PROGRAM MANAGEMENT	25 33000 •	7119000.	,		
12 SYSTEM INTEGRATION	944000.	2448699.			•
13 RELIABILITY	111600	133800			
14 QUALITY ACCEPTANCE	1445220.	5820000·		•	•
15 TITAN INTERSTAGE	582000.	670000+			
16 * TITAN SHROUD	0.0	1000000.			•
17SHUTTLE INTERFACES	20910000	1997000+			
IN TRAINERS & SIMULATORS	3110400.	100000.			
19 * EXPERIMENTS A 6 8	5000000.	39000000.			
20 GROUND STATION	3251000.	800000.			
21_* NEW COMPUTERS	4550000.				
A ALVIEL COST ATTOMS					
LAUNCH OPERATIONS 22 # LV-TITAN	0.0	22500000.			
23 * LV-SHUTTLE	0.0	10000000.			
24 S-C SUPPORT	0.0	4950000.			
25. * FACILITIES	1347012.	362826.		1	
26 + SHUTTLE UPDATE FLIGHT	0.0	15000000.	4	•	
27 * EXPERIMENT UPDATE	0.0	39000000+			
28 * G.S.F.C. & OTHER	0.0	60000000		•	•
	*		9000000		
29 ORBITAL OPERATIONS	117262704.	581234638	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	*	•
G & A CHARGEAPLE	15126882.	74979232.	1160999.		
G & A	132389584				
NON-G & A SUBTOTAL	14197012.	194863680.			
MINAR O W POMINIAL	146586592		10160999.		
TOTAL *ND G & A CHARGE	FACTOR IAL			,	
THE G & A CHAPGE		TOTAL '	1007824640.		
COST OF ADDIL SHUTTLE REPAIR FL			0.0		

11

UPTIME RATIO

	PROGRAM N	10 00	the Management of the same and the same as the same and t		<u> </u>
	PRUUKAM P	(U.) htt		•	•
SHUTTLE SCHEDULE DELAY 6.0				The second secon	
TOTAL SYSTEM MITF 48.0					
VAR. SUBSYSTEM SLOPE 1.25			- Marking are on the an artisty of Angelogy in the greater design believe		
			•		
SHUTTLE-MAINTAINED PROGRAM	· ·	•••••••••	• • • • • • • • • • • • • • • • • • • •		<u> </u>
(3 SPACECPART)-NOT OPTIMIZED	NON-RECURRING	RECURRING	OPERATIONS		
	00150000	**********	******	,	
? ENGINEERING	20150000 <u>-</u>	30649216			<del></del>
3 STABILIZATION		2250126.	- ,	•	, -
4 THERMAL	8562705.	227517872	يت ديني در ياستجيدات	<del></del>	<u></u>
	2120000.	2910971	•		
5 S-C MECHANISMS	3520000.	2721483.			<del></del>
	4054853.	102589312.		/ `	In
7 * PRIMARY DOTICS	3300000.	8000878.			
9 CHMM. 6 DATA HANDLING	23617648	153337520.		/8/	
PNEUMATICS	170783+	33150784.		/ 8 / _	<del> </del>
10 TEST & SUPPORT FOUTPMENT	4669540.	20706 14.			
11 POODRAM MANAGEMENT	25 3 1000 •	7119000			
12 SYSTEM INTEGRATION	944000	2448698•		/ 2/	
13 RELIABILITY	111600.	111000		REPROU	····
14 QUALITY ACCEPTANCE	1445220.	5820000.		/ 💝 /	r
15 TITAN INTERSTAGE	582000.	670000.			
16 * TITAN SHROUD	0.0	100000.		/6/	
17 SHUTTLE INTERFACES	20910000.	1997000.			
18 TRAINERS & STHULATORS	3110400.	100000.			
19 * FERFRIMENTS A 6 B	5000000	39000000.			
20 GROUND STATION	3251000.	800000.			
21_* NEW COMPUTERS	4550000.			<u></u>	
_ LAUNCH OPERATIONS					
22 * LV-TITAN	0.0	22500000.			
23 * LV-SHUTTLE	0.0	10000000		•	
24 S-C SUPPORT	0.0	4950000			•
'25 * FACILITIES	1347012.	362826.			
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000			
27 * EXPERIMENT UPDATE	0.0	39000ãoo.			•
28 * G.S.F.C. & OTHER	, 0.0	60000000	,	· •·····	, " ۱ ,
29 ORBITAL OPERATIONS			9000000		
G & A CHARGFABLE	117262704.	581234688.	40000004	,	
G & A					
SUSTAL	15126882.	74979232.	1160999.		
NON-G & A SUBTOTAL	132789584.	65621 1760.			
TOTAL	14197012.		10140000	•	
*NO G E A CHAPGE	146586592.		10160999.		
	T:	OTAL	1007824640.		
COST OF ADD'L SHUTTLE REPAIR FL	rs	,	0.0	· · · · · · · · · · · · · · · · · · ·	
GRAND TOTAL			1007024640.	•	
NO. OF FAILURES 3.11					

,	PERCOM PR	MGDAM	•	
·	7-EKCOM FK	· · · · · · · · · · · · · · · · · · ·		
•	PROGRAM	NO.89	,	
		والمقابلة والداري والمسويان وسيون	and the same of th	
SHUTTLE SCHEDULE DELAY 12.0		n, and a price and register or the tree numbers,	وسيستون باعدماريردها الراء يربد الدارويدان	
TOTAL SYSTEM MITE 48.0 " VAR. SURSYSTEM SLOPE 1.25			•	•
Carrier of The Carrier of Takers of 4888 and 8899 commencer				
		*******		
SHUTTLE-MAINTAINED PROGRAM (3 SPACECRACT)-NOT OPTIMIZED	MON-DECUBBING	OCCUPOTNO	OPERATIONS	
( ) SPACE CRAIT ( ) -NOT OPERATOR	MOM-KECOKK (MG	MLCOULING ""		7
t STRUCTURE	20150000.	30647216		·
? ENGINFERING	17500000.	2250126	• •	***
3 STATILITATION	8562705.	,227517872+		
4 THERMAL	2120000.	2910971+		'
5 S-C MCCHANISMS	3520000. 4064853.	2721443 102589312.		
6 ELECTRIC POWER 7 * PRIMARY OPTICS	3300000.	8000878		,
A COMM. & DATA HANDLING	23617648	151117520.	approximation of the second	_
9 PNFUMATICS	1/0783.	3 11 50 784		
TO TEST & SUPPORT FOUTPMENT	4669540.	2070614.		•
11 PROGRAM MANAGEMENT	2533000.	7119000		
12 SYSTEM INTEGRATION	944000.	2448699.		•
13 RELIABILITY	111600.	171900		
14 QUALITY ACCEPTANCE 15 TITAN INTERSTAGE	1445220. 582000.	5820000. 670000.		•
16 * TITAN SHROUD	0.0	1000000	And the second of the second o	
17 SHUTTLE INTERFACES	20910000.	1997000.		
18 TRAINERS & SIMULATORS	3110400.	10000.		
10 # EXPERTMENTS A & A	5000000	39000000+		
20 GPOUND STATION	3251000.	800000.		
21 * NEW COMPUTERS	4550000.	0.0		
LAUNCH OPERATIONS				
22 * LV-TITAN	0.0	22500000.		
23_ *LV-SHUTTLF		10000000.		
24 SHC SUPPORT	0.0	4950000		
25 * FACILITIES	1347012	362876		
26 * SHUTTLE UPDATE FLIGHT	0.0	15000000. 39000000.		
27 * EXPERIMENT UPDATE  29 * G.S.F.C. C OTHER	0.0	60000000		
THE TOTAL SECTION		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
29 DRBITAL OPERATIONS	-		9000000.	
G & A CHARGFABLE	117262704.	59123469B.		<u> </u>
G & A	15126882.	74979232.	1160999.	•
SUBTOTAL	132389584.	656213760.		
NON-G & A SUBTOTAL	14197012.	194863680. 851077376.	101609994	
*ND G & A CHARGE	1403402424		101003331	
-au o o a conduc		TOTAL	1007824640.	
COST OF ADDIL SHUTTLE REPAIR FLT			0.0	
GRAND TOTAL			1007824640.	
NO. OF FAILURES 2.60			<del></del>	,
UPT14F (YEARS) 11-20				